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MARCH, 1918.

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# JOURNAL

OF THE

## New York Entomological Society.

VOL. XXVI.

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No. 1

### THE AËROBIC NATURE OF INSECT TISSUE.

By R. W. GLASER,

FOREST HILLS, MASS.

It is a well-known fact that insect tissue is aërobic, *i. e.*, tubes called tracheæ ramify the entire body and supply air directly to the cells. There is no medium, like the mammalian erythrocytes, which transfers the oxygen from the lungs to the tissues.

During the course of some work on the cultivation of insect blood cells *in vitro*, I made some observations that clearly showed insect tissue to be dependent upon direct air. Since the method could be very nicely used in entomological class demonstration work, I thought it well to present the observations. The method for preparing tissue-culture slides is familiar to all biologists, so I will not dwell on very many of the technical details.<sup>1</sup> Suffice it to say, that I used depression slides with thin *No. 0* cover slips so that I could work effectively with the oil immersion lens. Both army worm (*Cirphis unipuncta*) and gipsy moth caterpillar (*Porthetria dispar*) blood was found suitable for the experiments.

All work must be done under sterile conditions. The animals to be operated upon are held in one hand and bent back so that the ventral side can be washed off with alcohol. When this evaporates, the tip of a proleg is then quickly cut off with sterile scissors and the drop

<sup>1</sup> Those interested in the cultivation of insect tissue are referred to: R. W. Glaser, "The Growth of Insect Blood Cells *in vitro*." *Psyche*, Vol. XXIV, No. 1, 1917.

of blood which oozes forth is caught on a sterile cover slip. The cover slip is then placed over a sterile depression slide, and the edges are sealed with melted vaseline.

Insect blood cells grow very well in their own plasma, but Locke's solution can be added if desired. Locke's solution is isotonic with insect tissue, but has no particular advantage except that its addition thins out the plasma and produces a greater transparency in the preparations.

If we carefully place the drop of blood in the center of the cover slip the cells grow very slowly. Many disintegrate entirely, and others do not show any visible growth for two or three weeks. Even then no large syncytial masses are formed, and sooner or later, as soon as the supply of oxygen in the depression slide is diminished, begin to disorganize. At first I supposed that the death of the cells was due to the exhaustion of the required nutrition, but such was not the case. Insect blood cells can be kept alive for a surprisingly long time without the addition of fresh media. If the preparation, in which the cells are disintegrating, is shaken a bit so that the drop of blood flows over along the edges of the cover slip a change will soon become apparent. On reëxamination after about two or three weeks the cells lying in close proximity to the vaseline will appear healthy, and beautiful large syncytial masses will be found.

In order to be certain that the vaseline was not giving off something which stimulated the cells to grow, the following experiments were performed: Blood was placed in the center of the cover slips and a small piece of sterile vaseline added to each drop. Six such slides were prepared, but I failed to notice any large syncytial masses even after six weeks. The preparations were then shaken so that the blood flowed over along the edges of the cover slips and in two to three weeks more the syncytial masses were obtained.

We can conclude from these observations that direct air is absolutely necessary for the growth of insect tissue. The blood cells kept in the center of the cover glass soon exhaust the oxygen present and cease to grow. However, if they are brought in contact with the vaseline through which the air undoubtedly filters, they become rejuvenated and form syncytia. Of course air filters through the vaseline also when the cells are confined to the center of the cover slip, but it is not so readily nor so rapidly obtained by the cells. The latter are

highly metabolic and require oxygen very rapidly. My contentions were further proven by preparing slides and sealing the edges of the cover slips with a thick ring of paraffin. The blood was made to flow over along the edges as usual, but no syncytial tissue-like masses were formed. Apparently the air was unable to filter through this thick layer of paraffin.

A drop of blood permitted to remain in the center of the cover slip usually will assume a light yellow or light brown color. However, if the preparation is manipulated in such a way as to permit the drop of blood to come in contact with the edges of the cover-slip it rapidly turns black in color. This is due to the fact that the air filters through the vaseline and the tyrosinase present in insect blood oxidizes the colorless tyrosine producing a dark pigment.

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## A LARGE NUMBER OF SPECIES OF BUTTERFLIES OBSERVED IN ONE DAY'S COLLECTING.

BY FRANK E. WATSON,

NEW YORK, N. Y.

This paper might be entitled Butterflies of Fort Montgomery, as it deals exclusively with those observed at that locality, except that no attempt has been made to list all the species known to occur there. The writer simply wishes to bring out what he believes to be an extraordinary number of forms observed on the wing in one day in a single locality.

Fort Montgomery, Orange Co., N. Y., is a small historic town situated on the west bank of the Hudson River, some five miles south of West Point and about forty-three miles, on an air line, north of New York City. It is practically in the heart of the Highlands, with Anthony's Nose looming up on the opposite shore and Bear Mountain a mile or two to the west.<sup>1</sup> The region is well watered and rather rugged; the hills are steep and attain an average altitude of about 1,200 feet; the vegetation is rich and diversified. The collecting

<sup>1</sup> Those interested should consult the U. S. Topographical Maps—West Point and Sehunemunk Quadrangles.

is naturally excellent and this, together with the charming scenery, makes a day spent there of great delight to the naturalist.

It would not be fair to speak of Fort Montgomery without a word of thanks to Mr. Wm. T. Davis, the first of our local entomologists to collect there and the one who induced the writer, among others, to visit the region.

On July 1, 1906, Messrs. Gaylord C. Hall, Harvey Mitchell and the writer journeyed to Fort Montgomery via the West Shore R. R. and arrived about 9 A. M. We followed the road running west to The Torne, taking the left-hand fork which traverses the region back of Bear Mountain. We collected mostly on the road but the adjacent fields, meadows and open places were also examined. It was a clear, beautiful day, just nicely hot for butterflies, and they were in great abundance.

#### PAPILIONIDÆ.<sup>2</sup>

**Papilio polyxenes asterius** Cramer.<sup>3</sup>

**Papilio glaucus glaucus** Linné. Common about the wet spots along the road and also on dung.

**Papilio troilus troilus** Linné. Very common, under the same conditions as the preceding species and often in company with it.

**Papilio marcellus** Cramer. A single specimen was seen by Mr. Mitchell feeding at a damp place in the road, in company with *glaucus* and *troilus*; it immediately took wing and, although followed some distance down the road, it escaped by flying into the thick woods.

#### PIERIDÆ.

**Pieris rapæ** (Linné). Common everywhere.

**Eurymus philodice** (Godart). Common.

#### DANAIDÆ.

**Danaus archippus** (Fabricius).

#### SATYRIDÆ.

**Enodia portlandia** (Fabricius). About five or six specimens were seen. They may be found on dung or damp spots along roads.

<sup>2</sup>For convenience the Check List of Barnes and McDunnough is here followed.

<sup>3</sup>Nomenclature after Rothschild and Jordan.

*Cissia eurytus* (Fabricius). Common.

*Satyrodes canthus canthus* (Linné).

*Cercyonis alope* (Fabricius).

#### NYMPHALIDÆ.

*Argynnis idalia* (Drury). One freshly emerged male was captured and forms the only record.

*Argynnis cybelle cybelle* (Fabricius). Very common along the road at mud-puddles, on dung and on milk-weed blossoms.

*Argynnis aphrodite aphrodite* (Fabricius). Very common and generally in company with the preceding species.

*Brenthis bellona* (Fabricius).

*Euphydryas phaeton* (Drury). The only specimens recorded were two females captured by Mr. Hall.

✓ *Phyciodes nycteis nycteis* (Doubleday and Hewitson). Common along the road and rather old and worn.

*Phyciodes tharos tharos* (Drury). Common.

*Polygonia interrogationis* f. *æst. umbrosa* (Lintner). Rather common at springs, damp places along the road and on dung.

*Polygonia comma* f. *æst. dryas* (Edwards). Very common at the same places as the preceding species.

*Polygonia progne* (Cramer). About nine specimens were captured by us and a few others were noted. Found under the same conditions as the preceding species.

*Aglais j-album* (Boisduval and Le Conte). Seven were taken by us; only a few others were seen. Observed in similar situations as the preceding species. One individual trapped itself in Mr. Hall's net. Mitchell who was a few yards ahead, struck at this specimen and missed; it flew into Hall's net, which he was holding above his head at the time, and perched complacently in the bottom.

*Aglais antiopa* (Linné). At wet spots along the road, etc.

*Vanessa atlanta* (Linné). On dung, damp places, etc.

*Vanessa virginiensis* (Drury) = *huntera* (Fabricius). Habits similar to those of the preceding species.

*Basilarchia astyanax* (Fabricius). Rather common. It is found on dung, muddy places, etc.

*Basilarchia archippus* (Cramer). Very common.

## LYCÆNIDÆ.

**Strymon titus titus** (Fabricius). Not common. Very fond of milk-weed blossoms.

**Strymon edwardsi** (Saunders). Scarce. Found on the milk-weed flowers.

**Strymon calanus** (Hübner). Exceedingly common, especially in the mid to late afternoon. Mitchell took a very large and fine series. They are very fond of flitting about the low terminal branches of butternut-trees, which is one of its food-plants. These butterflies may also be found sitting about on the vegetation and feeding on the milk-weeds.

**Heodes hypophlæas hypophlæas** (Boisduval). Common.

**Everes comyntas comyntas** (Godart). Common.

**Lycænopsis pseudargiolus pseudargiolus** f. *æst. neglecta* (Edwards). Rather common. On damp places along the road.

## HESPERIIDÆ.

**Epargyreus tityrus** (Fabricius). Common. On flowers, dung, etc.

**Achalarus lycidas** (Smith and Abbot). Rather common. On milk-weed blossoms.

**Cocceius pylades** (Scudder). Common.

**Ancyloxypha numitor** (Fabricius). Common.

**Polites manataaqua** (Scudder). The two females captured were the only ones seen.

**Polites mystic mystic** (Scudder). In damp meadows and marshes.

**Polites peckius** (Kirby). Common. On flowers, etc.

**Catia otho egeremet** (Scudder). Common. On flowers, etc.

**Poanes hobomok** (Harris). Common. The specimen observed were very old.

**Euphyes vestris** (Boisduval) = **metacomet** (Harris). Rather scarce. The individuals taken were in fresh condition. To be found at damp places and on dung along the roads, as well as on various flowers, especially those of *Asclepias*. This species had become common by July 4.

**Atrytonopsis verna** (Edwards). Common. Habits similar to the preceding species.

It will be noticed that the above list contains forty-four species.

I believe that there were fifty, possibly one or two more, species flying on this day and that, with a little more luck, the list would have reached the half-hundred mark. The following notes will, I think, bear out my contention.

On July 4, of the preceding year, the writer took ~~to~~ flown specimens of *Mitoura damon damon* (Cramer) at the same locality. As we did not have time to visit that section of the territory where the *damon* were previously taken and where there is a station of red-cedar trees, we may have missed this species. It is possible, of course, that 1906 was not a *damon* year.

On July 4, 1906, or three days later than the date of the above list, I again visited the same region. It was expected that even a larger number of forms would be recorded but in this I was disappointed. The day was clear and fine but for some reason butterflies were not so numerous as they were on July 1 and only thirty-nine species and one variety were noted. The varietal form being a single worn specimen of *Poanes hobomok* form *pocahontas* (Scudder). This species, as is well known, is most common during early June. Two old specimens of this dimorphic form were also observed by me at this locality on June 24 of the same year, so that it was certainly flying on July 1 although not observed by us. Three additional species which were captured on the July 4 trip were: *Feniseca tarquinius* (Fabricius), two specimens, somewhat flown, one of which alighted on my hand and fed on the perspiration; *Strymon acadica* (Edwards), several individuals, somewhat worn; and *Enphyas conspicua* (Edwards) = *pontiac* (Edwards), two specimens, condition not noted. Of these three species, *tarquinius* and *acadica* were surely flying on July 1 and more than likely *conspicua* was as well.

It was with considerable reluctance that we quit such good collecting, about 4 P. M., in order to catch our train. The forty-four species were, therefore, collected in about six and one half hours (allowing half an hour for lunch) and probably over less than five miles of territory.

## MICROCLYTUS—A CORRECTION.

BY CHARLES W. LENG,

STATEN ISLAND, N. Y.

According to the Classification of the Coleoptera of North America (S. M. C. no. 507, 1883), the genus *Microclytus* has the following characters, viz.: second joint of antennæ equal to fourth, antennæ not spinose. The type of the genus is *Cyrtophorus gazellula* Hald., and it is pointed out, p. 305, that it has the form and coloration of the European *Anaglyptus mysticus* but differs "essentially by the second joint of the antennæ being fully half as long as the third and scarcely shorter than the fourth joint."

In 1887 I noticed that in my two specimens of *Microclytus* from Canada the antennæ were not as described in the Classification but had the second joint short as usual in the *Anaglypti*. The discrepancy was discussed with Dr. George H. Horn, in whose collection were two specimens from Ohio like those on which the Classification was based, and we concluded that the difference was a sexual matter, and exchanged specimens so that each should have both sexes. The amended key to the genera of *Anaglypti* (Ent. Am., II, 1887, p. 195) and the treatment of the species of *Microclytus* (Ent. Am., III, 1888, p. 23) by which *M. gibbulus* and *M. niger* of Leconte were sunk in synonymy, were based upon the theory that they were identical with *M. gazellula* Hald. in which species the antennæ differed in the sexes.

I regret to say that this appears now to have been entirely wrong, for recently Mr. Frank Morris, of Peterborough, Ontario, has called my attention to a considerable number of specimens of *Microclytus* that he has caught on the blossom of choke-cherry in which the second joint of the antennæ is only *half the length of the fourth joint in both sexes*, thus disproving the supposed sexual character of the discrepancy noted thirty years ago. The antennæ in the specimens assumed to be males are nearly as long as the body, while in those assumed to be females they barely attain the middle band of the elytra. In both cases the antennæ bear the same long hairs that are to be noted in *M. gazellula*, and to which Casey has called attention (Memoirs, III, p. 375) as characteristic of the genus. The specimens sent



by Mr. Morris differ however from *M. gazellula* in the relative length of the antennal joints and represent apparently the *gibbulus* of Leconte erroneously sunk in synonymy.

In seeking a name for these specimens of *Microclytus* one has to choose between *gibbulus* Lec., *niger* Lec., *insinuans* Csy., *frosti* Csy., and *compressicollis* Gory. Of these *niger* Lec. may be discarded as a clerical error because in the Melsheimer Catalogue, 1853, appears "*Cyrtophorus gibbulus* Lec. (*Clytus*) L. Sup. 234; *niger* Lec. (err: cler.) J. Acad. 2<sup>a</sup> 2. 20." In regard to *compressicollis* Gory the description (copy of which I owe to the kindness of Mr. H. S. Barber) reads: "Niger; thoracis medio elevato; elytris basi gibbis postice dimidio obscuris; pedibus rubris. Long. 4 lig. Larg. 1 lig. Noir et pubescent. Corselet élevé au milieu, comprimé sur les côtés, avec un point brun. Elytres d'un brun rouge, élevées à la base, avec deux traits oblique cendrés, un semblable transversal vers le milieu, suivi d'une tache noire. Extrémité obscure, couvertes de poils cendrés. Dessous du corps et pattes d'un brun rouge. Premier article de l'abdomen avec le bord postérieur noirs, et une tache blanche de chaque côté; les autres articles noirs ainsi que les jambes." It seems to me impossible, with no mention of the antennæ, to say whether this description antedates that of *gazellula* or of *gibbulus*. Aurivillius in the Junk Catalogue includes both the latter as synonyms of *compressicollis*, but as they are not identical, his course cannot be followed. Casey's description of *insinuans* was written under the belief (presumably) that *gibbulus* was actually a synonym of *gazellula* as had been published and appears to cover the Ontario specimens which we now consider as representing *gibbulus*. His description of *frosti* appears to cover at best but a race of *insinuans* occurring in Maine. I have not seen the types and my opinion is based upon the descriptions and the following specimens; which illustrate the distribution of the genus:

Two *M. gazellula*, St. Vincent, Pa., and Wilmerding, Pa., in collection of V. J. Zahrobsky.

Two *M. gazellula*, Ohio, in my own collection.

One *M. gazellula*, Pa., in collection of Chas. Schaeffer, all of which are apparently females.

Six *M. gibbulus*, Peterborough, Ont., in collection of Frank Morris.

Four *M. insinuans*, Adirondack Mts., N. Y. in collection of Howard Notman.

3 *M. frosti*, Maine, in my own collection.

1 *M. gazellula* ♂ (as formerly identified), Canada, in my own collection.

Both sexes are represented in the specimens of *gibbulus* and its synonyms.

Mr. Morris states that he has seen a specimen of true *gazellula* from Canada. Dr. Hamilton in his Catalogue of the Coleoptera of Southwestern Pennsylvania says *gazellula* is rare at Allegheny, Pa., but common at St. Vincent, and Henry G. Klages in his supplement thereto (Ann. Carn. Mus., I, 1901, p. 290) adds *gibbulus* "believed to be a distinct species by Dr. Hamilton." It seems therefore impossible to consider *gazellula* and *gibbulus* as geographic races of one species, since there is evidence that their ranges overlap.

The bibliography and synonymy should stand as follows:

**Microclytus gazellula** Hald., Trans. Am. Phil., X, 1847, p. 42 (*gazellula* err. typ.); Proc. Ac. Phil., IV, 1847, p. 372; Lacard. Gen. Col., IX, 1869, p. 89, note 3; Leng (in part), Ent. Am., III, 1888, p. 23. Pa., Ohio, Canada.

?**compressicollis** Gory., Monogr. des Clytus, 1835, p. 106.

**M. gibbulus** Lec. Agassiz, L. Sup., 1850, p. 234; *niger* (err. cler.). J. A. P., ser. 2, II, p. 29; Leng (in part), Ent. Am., III, 1888, p. 23; *insinuans* Csy., 1893, N. Y. Ac., VII, p. 591; L. Sup., Ont., Adirondacks, Pa. (?).

var. (?) **frosti** Csy., Mem. Coleop., III, 1912, p. 375. Maine.

I am not unaware that Aurivillius treats the genus *Microclytus* as a synonym of *Anaglyptus*; but in this he stands opposed to all American authors, Leconte, Horn, Hamilton, Casey and Schaeffer, who has quite recently (JOURN. N. Y. ENT. SOC., XII, 1904, p. 223) given a key to the genera of Anaglypti; and his course cannot therefore be adopted.

DESCRIPTION OF A NEW SPECIES OF  
PIEZOCORYNUS.

BY CHARLES W. LENG,

NEW YORK, N. Y.

**Piezocorynus virginicus** new species.

Oblong, thorax narrower in front, as wide as the elytra at base, sides straight and oblique, body rounded behind with parallel sides; dark brown, legs and antennæ with paler bands, pubescence irregularly condensed in pale spots especially towards sides of elytra. Head nearly black, finely confluent punctured, punctures forming fine transverse rugæ on the occiput; irregularly and sparsely clothed with short yellow hairs. Antennæ shorter than the body in the female (male not seen), slender with a loose, three-jointed, flattened club; basal joint short and stout, pale; second joint longer, elongate, conical; joints three to seven very slender but each thickened apically; joint eight elongate, triangular; joints nine to eleven wider and fringed with hairs, nine strongly triangular, black, emarginate at apex, ten wider than long, black, obliquely emarginate at apex, eleven elongate-oval, pale. The joints two to eight are each paler apically. Thorax as long as its basal width, tapering obliquely to about half as wide at apex, finely granulate, the basal ridge finely elevated, forming an acute angle at its extremities with the acute lateral margin, which extends nearly to the apex; disk without elevations or channels; a few yellow hairs are seen above, sometimes feebly condensed into spots, more at the sides, and enough beneath to clothe the surface fairly thickly. Elytra parallel, with rows of distant punctures, punctuation however obscured by dense pubescence, of which the yellow hairs are usually concentrated at the sides and apex, leaving the disk darker. The elytra are conjointly rounded at apex. Body beneath and abdomen clothed rather sparsely with pale hairs. Length 3.25-5.00 mm.

Buckingham county, near Wingina, Virginia.

Described from fifteen specimens collected by Col. Wirt Robinson, July 12, 1917, ovipositing on a recently killed black oak, and four specimens collected from the same tree by Wm. T. Davis.

This species resembles *P. dispar* in the oblique emargination of the joints of the antennal club, but differs in the more strongly triangular form of the joints of the club and in their marginal hairs. It also lacks the thoracic elevations of *dispar*; the yellow pubescence of the elytra is differently arranged, being concentrated on the disk in *dispar*, on the sides in *virginicus*. Mr. Davis has pointed out further

than in *dispar* and *maestus* all the tibiae are annulated near the middle, while in *virginicus* the annulations are nearer the base of each tibia and more irregular in form, some of the paler hairs extending to the basal part of the tibia on its inner side.

From *mixtus* and *maestus*, *P. virginicus* differs so greatly in the form of antennae that there is no risk of confusion. The antennae of *P. dispar* ♂ are one half longer than body (not one half the length of the body as erroneously stated in "Rhynchophora of N. E. America") and it is possible that the male of *virginicus* has also antennae longer than the body.

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### NOTES ON THE OVIPOSITION OF SOME SEMI-AQUATIC HEMIPTERA (HEBRUS, SALDA, LAMPROCANTHIA).

BY H. B. HUNGERFORD,

LAWRENCE, KANSAS.

In 1911 the late Doctor Heidemann published "Some Remarks on the Eggs of North American Species of Hemiptera Heteroptera,"<sup>1</sup> in which he listed the eggs of the Hebridae, Saldidae and Mesovelidae as unknown. Since that time Reuter in his "Neue Beiträge zur Phylogenie und Systematik der Meriden, nebst einleitenden Bemerkungen über die Phylogenie der heteropteren Familien, 1910" attempted to show the phylogenetic relationships of the families of heteroptera. In 1912 he modified his system in the light of added evidence. It is in his "Bemerkungen über mein neues Heteropteran System, 1912" that he quotes Bergroth to the effect that Bueno had examined the egg of Mesovelina and established its great similarity to the Nabidae. Since that time the writer has figured and described the egg of *Mesovelina mulsanti*, White.

In reviewing Kirkaldy's splendid papers on British water bugs, 1894-1908, Wesenberg-Lund's "Fortpflanzungsverhältnisse: Paarung und Eiablage der Süßwasserinsekten," as well as such texts as Bade, '09, Brauer, '09, Ulmer, '11, and Brocher, '13, it would appear that the egg stages of Hebrids and Saldids are as yet unnoted.

<sup>1</sup> Proceedings Ent. Soc. Wash., XIII, No. 3, p. 128.

In connection with his work in the limnological laboratory at Cornell University it was the writer's good fortune to observe the oviposition of several of the aquatic and semi-aquatic bugs. It is concerning the latter that he wishes to report herewith.

To one accustomed to collecting in the sluggish streams and artificial ponds in Kansas the environs of Ithaca, N. Y., afforded a rare opportunity. Here within easy reach of Cornell University are to be found all gradations from sparkling brooks, broken by waterfalls and rapids, to dark-colored sluggish streams of the upland bogs, from spring-fed pool to lake conditions.

It was on the border of a spring-fed pool in an upland meadow near Ringwood Hollow that Hebrids and two species of Saldids were found in numbers. The Hebrids were numerous in the moss and dead grass by the water's edge while the Saldids were about the grass and sedge clumps and upon the moist earth of the exposed areas.

#### HEBRUS.

On June 4 Mr. C. H. Kennedy brought to the writer an adult Hebrus from Ringwood Hollow. Subsequently they were found about several water bodies in the neighborhood of Ithaca. By June 22 at Ringwood these little bugs were mating in numbers and many were brought into the laboratory.

On June 28 the pool was visited again and a goodly number taken on the moist earth at the water's edge. By disturbing the moss it was found that they would take to the open areas, even venturing upon the water for a short run. They are not as safe upon such footing as are the little Microvelia which they superficially resemble, although when one became submerged accidentally it walked upside down under the surface film as upon a ceiling, stopping now and then to clean the antennæ and limbs as it frequently does when in its normal environment. The body was surrounded by a layer of air which held it up to the surface film. It finally came upon a bit of moss projecting from the water and escaped.

The live bugs taken June 22 and June 28 were placed in large petries prepared for them by placing some moist sand in the bottom and adding a few bits of moss.

On June 26 the moss in the petrie containing those captured June 22 was examined superficially under the binocular and no eggs dis-

covered. A more careful examination with dissecting needles revealed some of the yellowish-white eggs already showing the red eye spots, hidden between the closely approximated leaves. Some of them seemed to lie on the upper concave side beneath the pale green sheath of the moss leaf, as shown in the figure (Pl. I, fig. 2). For the most part they were concealed as shown in fig. 8, between the leaf and the stem.

In an endeavor to determine whether the female would ever place the eggs in the tissues of plant stems, some females were confined in a small stender dish with a leaf of moneywort, a soft stem of a dead sedge, and a variety of moss having the leaf axils far apart, thus providing no hiding place for the eggs. Eggs were laid in the mat or tangle of rootlets at the base of the moss and, in some instances, the tip of one leaf was glued to the one above it and here two or three eggs would be found as shown in the sketch (Pl. I, fig. 4).

#### DESCRIPTION OF THE EGG.

Size.—.625 mm. by .325 mm. This represents the size shortly before hatching. Somewhat more slender when deposited. The eggs are large for the size of the bug. One female measuring .925 mm. across the prothorax contained four well-developed ova each measuring .625 mm. by .25 mm. The figures of the female abdomen and the egg are drawn to the same scale (Pl. I, figs. 3 and 2).

Shape.—Elongate oval, ends rounded, length about two times the width.

Color.—Pearly white changing to yellowish white as embryo develops within. Some appear to be surrounded by transparent gelatine. Under the low power compound the surface of the egg is seen to be covered by short irregularly arranged elevations. In the case of those containing well-developed embryos the eyes show as pink spots and a pair of black dots lie on the ventral side near the apex of the head.

#### NEWLY HATCHED NYMPH.

The nymph upon issuing from the egg casts a thin transparent membrane which surrounds each appendage separately and is of the nature of a true moult. This the writer proposes to designate the *postnatal moult*. It is possessed by many heteroptera and some other insects observed by the writer.

## HABITS OF ADULT.

The Hebrids were fed, in captivity, upon newly killed midges, mosquitoes, and plant lice. They are cleanly little creatures grooming themselves much after the fashion of *Microvelia* as reported by Bueno. They were observed to be positively phototropic to electric light. When a light was brought to one side of the petrie containing many individuals they would promptly move to side of greatest illumination.

## SALDIDS.

The two species of Saldids observed were *Salda anthracina* Uhl. and *Lampracanthia crassicornia* Uhl. Both of these are shiny black, slightly hirsute species with tegmina coriaceous. The former is plump bodied and of fair size, the latter a smaller, more slender form, covered sparsely with stiff hairs.

They have the same habitat and attempt to escape by running and by quick short jumps rather than by flight. Their food, mating, and oviposition habits are much the same. When first observed about the Ringwood pool on June 22 only adults were found of the *L. crassicornia* while the *S. anthracina* were all in the nymphal stage. June 28 many of the latter were in the last nymphal stage. Eleven of these were brought in alive, placed in a large stender dish and fed flies, Jassids, etc. July 1 one became adult and by July 5 there were four adults, the remainder following shortly. Mating took place and eggs were found between the leaves of the moss on July 16.

It was noted above that the smaller species was in the adult stage when first taken. These were at once placed under observation in jelly glasses containing a quarter inch of moist sand. One pair was placed in each glass in order to get a record of mating and egg-laying. Most of the observations relate to this species, although they apply almost equally well to the larger form.

## HABITS OF THE ADULTS.

They are shy, cautious creatures which hide among the clumps of shore grass and moss patches. They feed upon such insects as they may chance to meet, even the disabled of their own kind.

## MATING.

The male follows the female about for some moments, often minutes, before mounting her with a sudden pounce. He appears to keep at a respectful distance and if his first clasp is not secure he gets away quickly. And well he may, for in some of the glasses the males were killed and in one case the female was observed still feeding upon her unlucky mate. The males are smaller and more slender than the females and take a position on the left side of the female (as a rule) and a little below, appearing to perch upon the middle femur of the female's left leg. The middle and right hind legs of the male lie along the left margin of the female. With the antennæ directed backward he remains rigidly in place while the female moves about with antennæ directed forward. It was not possible to ascertain how the male could retain his position so firmly in place. All efforts to be certain that his legs were involved in clasping failed. Mating took place at short intervals and often lasted for half-hour periods. One pair was observed to mate repeatedly every day from June 28 to July 16 when the male was found dead. Eleven eggs had been laid during this time.

## OVIPOSITION.

The eggs were hidden away, one in a place as a rule, between the leaves of moss or beneath the sheaths of the shore grasses. When in the moss they are exceedingly inconspicuous and when at the base of grass clumps remain concealed until disturbed. Two illustrations are submitted herewith to indicate the manner in which they are to be found. (See Pl. I, figs. 6 and 10.)

EGG OF *S. ANTHRACINA*.

Size.—Length 1.05 mm., diameter .375 mm.

Shape.—Elongate cylindrical, one end broadly rounded, the other constricted near the end and curved upward in such a manner that in profile one side appears slightly concave and the other considerably convex.

Color.—Pearly white and shiny. Smaller end slightly whiter. Surface finely granular as seen under low-power compound.



NYMPH OF *S. ANTHRACINA*.

When this species was first taken all the specimens were in the last and next to last instar. The nymphs are somewhat more flattened than the adults. The antennal segments are thicker in proportion to their length and the eyes much less protuberant. Ocelli are lacking in the nymph while the adult possesses a pair of prominent ones. The tarsi are two-segmented in the nymph, three in the adult. Secondary sexual characters not apparent in the nymph.

EGG OF *LAMPACANTHIA CRASSICORNIS* UHL.

Size.—Length 1 mm., diameter .3 mm.

Shape.—Elongate cylindrical. Both ends bluntly pointed, one more than the other and curved upward. Camera-lucida drawings of the eggs of both species are shown drawn to the same scale on Pl. —, figs. 7 and 11.

## SUMMARY.

*Hebrus concinnus*, *Salda anthracina*, and *Lampracanthia crassicornis* were found about the moss and clumps of shore grasses bordering a swampy pasture pool in New York. All three bugs hide their eggs between the leaves of the moss. The Saldids often place their eggs at the bases of the grasses growing on the moist banks of the pool. *L. crassicornis* appeared as adults some ten days before *S. anthracina*.

The Hebrids are but little disturbed by close confinement and the Saldids can be kept in the laboratory if provided proper quarters.

These few notes are submitted at this time in view of the need for even meager information concerning the shore bugs herein discussed.

## EXPLANATION OF PLATE I.

Fig. 1. *Hebrus*, ventral view of male abdomen.

Fig. 2. *Hebrus*, egg partially dissected from a bit of moss. Egg shows the red eye spots of embryo within.

Fig. 3. *Hebrus*, ventral view of abdomen of female. (Drawings 1, 2 and 3 made to same scale. Note the relatively large size of the egg.)

Fig. 4. *Hebrus*. Eggs in loose-leaved moss showing attempt to conceal by fastening the tip of one leaf to the one above it with some gelatinous material.

Fig. 5. *Hebrus*. Egg freshly laid, surrounded by the hyaline tissue of a moss leaf.

Fig. 6. *Lamprocanthia crassicornis*, egg in situ between the leaves of moss.

Fig. 7. *Salda anthracina* egg. Camera lucida drawing. (Same scale as Figs. 6 and 11.)

Fig. 8. *Hebrus*. Egg in situ between the leaf and stem of a close-growing moss.

Fig. 9. *Lamprocanthia crassicornis*, ventral view of abdomen of male.

Fig. 10. A clump of sedges showing the eggs of *C. crassicornis* in situ.

Fig. 11. *L. crassicornis* egg. Compare with Fig. 7.

Fig. 12. *L. crassicornis*, ventral view of abdomen of female.

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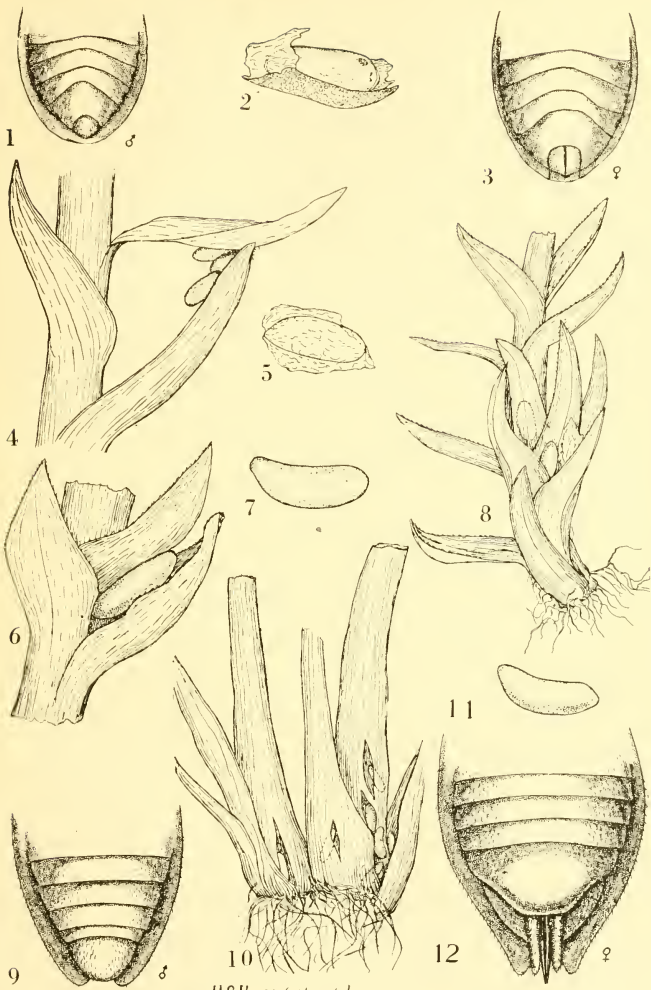
## THE EUROPEAN MOLE CRICKET, *GRYLLOTALPA* *GRYLLOTALPA* L., AN INTRODUCED INSECT PEST.

BY HARRY B. WEISS AND EDGAR L. DICKERSON,<sup>1</sup>

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The occurrence of the European Mole Cricket in this country has already been recorded (Jour. Econ. Ent., Vol. VIII, p. 500) but as the insect still maintains its existence in the place where it was first observed and as it may be introduced into other localities, it seems worth while to give a brief account of its habits and development. As previously noted the insect was first observed in this country in a nursery at Rutherford, N. J., where a large number of plants are yearly imported from Europe. "This infestation, which is undoubtedly of several years' duration, extends over several acres planted to herbaceous and ornamental stock, a considerable portion of which is used for show purposes only. The soil is rather light and porous and contains a variety of shrubs, shade trees, etc., such as one would naturally find in a nursery. No preference is shown by the cricket for any particular plant, its zig-zag burrows being found in different parts of the area irrespective of the kinds of plants growing there. The insects have been numerous enough for the nursery to detail several men at certain periods to hunt them out and destroy as many as possible every few days."

<sup>1</sup> The arrangement of the authors' names has no significance and indicates neither seniority nor precedence.



H. G. Hungerford del

Aquatic Hemiptera.



In regard to its occurrence in the Old World, Step states that it is plentiful in central and southern Europe and extends through Egypt and Western Asia to the Himalayas. In some localities, at least, it is abundant enough to cause more or less injury and accounts of its life history and habits may be found in various European publications. A few of these references are noted at the end of this paper and it is from these and from our observations at Rutherford that material for this account has been obtained.

The adult hibernates in horse manure or other warm places and becomes active in March. Mating occurs above ground in May and shortly afterward oviposition takes place. For this purpose, the female burrows into the ground and two or three inches below the surface, makes an oval chamber about the size of a hen's egg. According to Wood, the chamber is placed near the surface so that the eggs may be affected by the sun's heat. In this cavity eggs are laid from time to time, the total numbering from 100 to 400. The individual egg measures 2.5 mm. in length, is of an oval shape and dirty, grayish yellow in color. At Rutherford, in mid July, both eggs and young nymphs were collected, in some cases from the same nest. In about thirty days the young appear and remain in or near the nest under the supervision and protection of the female until after the first molt, according to some authors and until after the second molt, according to others. Step states that the female has to protect the young from the male. According to Van Den Broek and Schenk, the third molt occurs near winter and in April of the next year, the fourth molt takes place and wing pads appear. The fifth and last molt occurs about a month later and soon afterward mating takes place. Some authors believe that four years are required for the completion of the insect's development. —

In both sexes the wings are folded close against the body; the elytra or fore wings are comparatively broad and short and reach about half the length of the abdomen, while the under wings compactly folded extend posteriorly between the anal cerci. Figuiet says "they make little use of them (the wings), and it is only at nightfall that the mole cricket is seen to disport himself describing curves of no great height in the air." Wood states that "the flight of the mole cricket consists of a series of dips."

Thus while the insect may be found above ground in flight and at

mating time, it exists for the most part below the surface, burrowing in the soil and is active principally at night. Many times the burrow of the insect is found just below the surface so that the earth is raised above the gallery resembling a miniature mole burrow and by these the presence of the insect may be detected. Many of these surface galleries, extending irregularly through the soil, were noted at Rutherford and one of the workmen who had been acquainted with the insect in Europe stated that they were made by the male. When these were followed, they would frequently be found to extend down into the soil, especially where they came in contact with an obstruction such as a flower pot. In some cases they ended blindly near the surface. The burrow made by the female and connected with the egg chamber was quite different. In this case a channel about one inch below the surface extended in the form of a circle five or six inches in diameter. A burrow led from this somewhat downward and toward the center of the circle and terminated in the egg chamber. Another channel extending outward and downward from the circular one was apparently a place of retreat for the female since it was always in this latter burrow that the female was found whenever the ground above the egg cavity was disturbed and the egg chamber removed from the ground.

These galleries may occur in a variety of soils. Van Den Broek and Schenk state that the insect prefers soils rich in humus and may be found in different parts of Holland, sometimes in clay soil which is not too stiff. Wood says the insects prefer a loose sandy soil, but this does not appear probable for as Figuiet suggests "the chamber is scooped out in soil stiff enough to resist the action of rain." An examination of the arrangement and structure of the anterior legs shows how well these insects are fitted for working in the soil. These legs fit closely against the lower outer margins of the thorax and sides of the head, being broadened dorso-ventrally. The outer extremity of the tibia is provided with four well-developed teeth, while the modified tarsus also possesses two tooth-like projections and these are so arranged that they may move over some of the teeth of the tibia forming a shear-like arrangement, which it has been suggested is useful in cutting roots as the insect works its way through the ground. Moreover, an examination of living specimens shows that they can exert considerable pressure outward with the forelegs.

It has further been suggested that the anterior portion of the pronotum which covers the posterior portion of the head like a hood is used in shaping the gallery.

The object of the insect in burrowing through the soil is to obtain food, but there is a difference of opinion as to what it prefers. Some writers state that the normal food is vegetable matter while others assert that it is of an animal nature. Whichever may be the case, the insect is certainly harmful, causing considerable injury to plants. Van Den Broek and Schenk record it as injurious in truck gardens and nurseries, getting into heated frames and seed beds and destroying carrots and other plants, the roots of which it cuts off with its fore legs. Step states that the insect is not entirely vegetarian and probably only very slightly so. He says that while the insect has been accused of eating raw potatoes, it was probably after the insects associated with these vegetables. As indicative of its cannibalistic habits he states that the male has to be kept from the young nymphs and cites the fact that when three male crickets were shipped together with some terrestrial insects and pieces of potato, the terrestrial insects were devoured and two of the mole crickets were injured, while the pieces of potato were untouched. Wood, on the other hand, suggests that the normal food is plant tissue and that much damage is done to root crops where the insect is common. He states, however, that they will eat raw meat and are on occasion cannibals, as the males are quarrelsome and will fight to death, the victor always eating his conquered adversary.

Another investigator states that they are injurious to root crops but may prey upon underground insects and reports that a Mr. Gould "fed a mole cricket for several months upon ants." One Russian investigator found that the mole cricket is useful in destroying the larvæ of *Melolontha* but concludes that the damage done in fields and orchards outweighs the beneficial work. In Russia, the insect has been recorded as injurious in market gardens, orchards and even forests, attacking tomatoes, cabbage, turnips and other vegetables, hops, tobacco, plum and forest trees. In France similarly, the insect is injurious in market gardens and chicory seedlings, onion and lettuce are cited as particularly subject to injury while rice is mentioned as being attacked in Italy.

From these foregoing records, it is very evident that the mole

cricket is a considerable pest in numerous localities and, as one might imagine, a number of remedies or methods of dealing with it have been suggested. Among these, the following may be noted. First, using poisoned baits such as corn treated with arsenic, or cornstarch, water and phosphorus, these to be put in burrows or scattered on the ground before seeding time. Second, by injecting some substance into the burrows such as naphtha, petroleum, a 25 per cent. emulsion of petroleum, soapy water or calcium carbide. In this latter case, the moisture present liberates acetylene gas. Third, trapping the insects by a pot sunk into the soil and covered with a board or by means of holes filled with manure or vessels filled with water placed in the soil at different distances. Fourth, placing material on the surface such as lime at the rate of 16 cwt. to the acre or the use of naphthalene in the ground as it is being tilled. Fifth, by destroying the nests of the insects.

At Rutherford, a workman who was employed in the nursery, and who was engaged part of the time in dealing with this pest, used the following method to destroy the eggs and female. A circular gallery of the female was located by its exit hole, then the circular burrow followed around and with a trowel a cone-shaped mass of earth was removed, including the egg chamber and its contents, which were destroyed. The surface of the cone-shaped depression thus left was smoothed down and the gallery running from it, into which the female retreated, located and its opening cleaned out. Then a spoonful of kerosene was poured into the depression and, following this, enough water to fill up the depression and gallery. The kerosene rising to the surface flowed with the water into the gallery in which the female was hiding and forced her to emerge.

It might be added that the mole cricket is capable of producing a sound which is said to be not so shrill as that of the domestic cricket. Figuiet states, "from the month of April the males betake themselves to the entrance of their burrows and make their cries of appeal. Their notes are slow, vibrating and monotonous and repeated a long time without interruption and somewhat resembling the cry of the owl or goatsucker." Step describes it as a dull sound like "the churring of the goatsucker among birds." In consequence of this sound, according to Wood, it has received the following







Gryllotalpa.

popular names: churr-worm, jarr-worm, eve-churr, croaker. It is also known as the earth crab on account of its structure.

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#### EXPLANATION OF PLATE II.

- Fig. 1. Eggs.  
 Fig. 2. Young nymphs.  
 Fig. 3. Adult *Gryllotalpa gryllotalpa*.  
 Fig. 4. Inner view of fore-leg (enlarged).  
 Fig. 5. Outer view of fore-leg (enlarged).

### ANTS COLLECTED IN BRITISH GUIANA BY MR. C. WILLIAM BEEBE.

BY WILLIAM MORTON WHEELER,  
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Mr. C. William Beebe of the New York Zoölogical Park recently sent me for identification a series of ants from British Guiana. The specimens had been collected with an umbrella Sept. 15 to 20, 1917, near the Penal Settlements in the Bartica District from an area of only twenty square feet of bushes in a clearing. There are 156 specimens representing 42 distinct forms. Most of these are well-known neotropical species commonly found running over foliage, but fifteen of them (indicated by asterisks in the list) have not before been recorded from British Guiana and two of them are new to science.

Probably many minute species belonging to such genera as *Brachymyrmex*, *Solenopsis*, *Strumigenys*, etc., escaped detection owing to the method of collecting. Among the specimens are three strikingly myrmecoid Heteroptera and two myrmecoid Attid spiders. The collection as a whole presents a vivid picture of the number and variety of ants which in the tropics continually explore even the smallest patch of foliage.

Subfamily PONERINÆ.

1. *Ectatomma tuberculatum* (Olivier). Fourteen workers.
2. *Neoponera commutata* (Roger). One worker.
3. *Neoponera villosa* (Smith) subsp. *inversa* (Smith). Two workers.
4. *Neoponera carinulata* (Roger). A single worker.
5. *Neoponera unidentata* (Mayr). Three workers and four dealated females.
6. *Anochetus (Stenomyrmex) emarginatus* (Fabr.). Nine workers of the typical form, with the middle of the pronotum more or less shining and the head paler than the thorax and gaster.

Subfamily MYRMICINÆ.

7. *Pseudomyrma lævigata* Smith. A worker and a dealated female.
8. *Pseudomyrma gracilis* (Fabr.). A single worker.
9. *Pseudomyrma gracilis* (Fabr.) var. With only the petiole red, the mandibles and cheeks yellow and the remainder of the body black. Two workers.
- \*10. *Pseudomyrma rufa* Smith? A single worker.
- \*11. *Pseudomyrma elongata* Mayr. Three workers.
- \*12. *Pseudomyrma decipiens* Forel. A single worker.
- \*13. *Pseudomyrma dolichopsis* Forel. A single worker.
14. *Solenopsis lævissima* (Smith). Six workers.
15. *Solenopsis geminata* (Fabr.). A single very small worker.
16. *Pheidole* sp. Ten workers of a species closely related to *fallax* Mayr, but impossible of identification without the cospecific soldiers.
17. *Crematogaster limata* Smith subsp. *ludio* Forel. Eight workers.
18. *Crematogaster limata* Smith subsp. *parabiotica* Forel. Six workers.

\*19. *Crematogaster ornatipilis* sp. nov.

*Worker*.—Length 1.7–2.2 mm.

Head subrectangular, distinctly broader than long, as broad in front as behind, with straight sides and very feebly concave posterior border. Mandibles narrow, their apical borders oblique, 4-toothed. Clypeus broad, evenly convex, ecarinate, with the anterior border straight and entire in the middle. Eyes rather convex, moderately large, just behind the middle of the head. Frontal carinae short, slightly diverging behind. Antennae rather stout; scapes reaching a little behind the posterior corners of the head; funiculus with a 2-jointed club, shorter than the remainder of the funiculus; first joint as long as the three succeeding joints together, joints 2–8 distinctly longer than broad. Thorax short and robust; pronotum, without the neck, as broad as long, broad through the humeri which are rather angular, rapidly narrowing behind, rather convex above, submarginate on the sides. Promesonotal suture obsolete; mesonotum very short, sloping rapidly to the narrow and rather deep mesoepinotal constriction, on each side with a blunt denticle. Epinotum broader than long, nearly as broad as the pronotum through the humeri; the base very short, with an acute denticle on each side, the declivity large, concave, sloping, occupying all the space between the slightly diverging spines which are as long as the base, shorter than their distance apart, with slender, blunt, and slightly deflected tips. Petiole flat, a little broader than long, with semicircular anterior border, straight parallel sides and straight, transverse posterior border; in profile cuneate, less than twice as long as high at the posterior end. Postpetiole transversely elliptical, as broad as the petiole and nearly twice as broad as long, convex above, with a very faint longitudinal impression, distinct only at the posterior border. Gaster rather large, with straight, transverse anterior border, convex sides and pointed tip.

Shining; mandibles very sparsely punctate. Clypeus and head very smooth and shining, with very sparse, piligerous punctures; cheeks rugose in front, the space behind them and between the eyes and frontal carinae subopaque and densely and finely punctate. Neck smooth and shining; pronotum above finely longitudinally rugose and punctate; epinotum densely punctate and subopaque. Upper surface of petiole smooth, its posterior border and the postpetiole finely punctate. Gaster very smooth and shining, with very sparse, piligerous punctures, segments behind the first very feebly and finely shagreened.

Hairs on the body very conspicuous, sparse, erect, clavate, obtuse, yellow at the base, black at the tip, shorter on the head than on the thorax, pedicel and gaster. Mandibles, scapes and legs with numerous, rather long, pale, appressed and pointed hairs.

Black or very dark brown; mandibles, legs, antennal funiculi, insertions of scapes, epinotal spines, petiole, except at the posterior border, neck and articulations of the pedicel, reddish brown.

Described from four specimens.

This species is closely related to *C. abstincus* Forel, originally described from Panama (Biol. Centr. Amer. Formicidæ, 1899-1900, p. 85) and agrees well, except in the darker color, with the original description. When compared, however, with a specimen in my collection from Cayenne labelled "*abstincus*" by Forel, I note considerable differences. In the latter specimen the antennal scapes and joints 3-8 of the funiculus are decidedly shorter than in *ornatipilis*, the humeri are much rounder, there are no denticles at the sides of the mesonotum and base of the epinotum, the epinotal spines are smoother and more acute, the hairs on the body are not black at the tip and are less coarse and not clavate, the hairs on the legs and scapes are shorter and much less abundant and the color is darker. Additional material may show that *ornatipilis* is to be regarded as a subspecies of *abstincus*. Forel has described a subsp. *suturalis* from Venezuela, with the promesonotal suture very distinct (Mem. Soc. Ent. Belg., 19, 1912, p. 216).

20. *Cryptocerus spinosus* Mayr. A single worker.
21. *Cryptocerus minutus* Fabr. Four workers.
22. *Cryptocerus pusillus* Klug. A single worker.
23. *Cryptocerus maculatus* Smith. A single worker.
24. *Cryptocerus* (*Cephalotes*) *atratus* (Linn.). Nine workers.
25. *Cryptocerus* (*Cephalotes*) *oculatus* Spinola. A single worker.

#### Subfamily DOLICHODERINÆ.

26. *Dolichoderus atellaboides* (Fabr.). Three workers and a winged female.
- \*27. *Dolichoderus imbecillis* Mann. Two workers.
28. *Dolichoderus* (*Hypoclinea*) *bidens* (Linn.). Five workers.
- \*29. *Azteca trigona* Emery. A major and a minor worker.
- \*30. *Iridomyrmex iniquus* (Mayr.) var. *nigellus* Emery. A worker and a male.

#### Subfamily CAMPONOTINÆ.

31. *Gigantiops destructor* (Fabr.). Five workers.
32. *Camponotus* (*Myrmothrix*) *abdominalis* (Fabr.) subsp. *ustulatus* Forel var. *mediopallidus* Forel. A single media and four minor workers.

33. *Camponotus (Myrmothrix) femoratus* (Fabr.). Eighteen workers.
- \*34. *Camponotus (Myrmamblys) fastigiatus* Roger. Five workers.
- \*35. *Camponotus (Myrmobrachys) pittieri* Forel. A single worker minor.
- \*36. *Camponotus (Myrmobrachys) auricomus* Roger. A single worker minor.
- \*37. *Camponotus (Myrmobrachys) crassus* Mayr. var. near the subsp. *vesenyi* Forel. A major and a minor worker.
- \*38. *Camponotus (Myrmobrachys) beebei* new species.

*Worker minor*.—Length about 3 mm.

Head subrectangular, a little longer than broad, scarcely narrower in front than behind, with straight sides and posterior border and rectangular posterior corners, convex above, with subtruncated occipital region. Mandibles small and narrow, rather convex, 5-toothed. Clypeus broader than long, evenly convex, ecarinate, with straight anterior border, slightly emarginate on each side. Frontal area and groove obsolete. Frontal carinae subparallel behind. Eyes feebly convex, large, well behind the middle of the head. Antennal scapes moderately stout, extending about  $\frac{3}{4}$  their length beyond the vertical margin of the head. Thorax rather low, evenly arched above in profile, with very distinct promesonotal and mesoepinotal sutures. Epinotum with subequal base and declivity, the former in profile slightly convex and continuing the even curve of the pro- and mesonotum, the latter concave, sloping and forming a blunt obtuse angle with the base. Seen from above the pronotum is flat, twice as broad as long and distinctly margined on the sides, the mesonotum and base of the epinotum similarly flattened and each submarginate anteriorly. Sides of thorax flat. Petiole thick, nearly as high as the epinotum, its posterior surface flat in profile, its anterior surface formed of two planes, the ventral short and parallel with the posterior surface, the dorsal bevelled off to the superior border which is rather blunt. Seen from the front the scale is much narrower than the epinotum, its sides much contracted below, its superior border broadly rounded and entire. Gaster very broadly elliptical. Legs rather stout, fore femora incrassated.

Rather shining; head and thorax densely and finely punctate, their dorsal surfaces and the mandibles also with sparse, piligerous punctures. Gaster more finely punctate-shagreened; legs and petiole more shining and more superficially shagreened.

Hairs golden yellow, glistening, short and coarse, erect only on the fore coxae, tips of femora and tips of antennal scapes, absent on the petiole and sides of the thorax, appressed and rather sparse on other parts of the body, more abundant on the gaster but not concealing the sculpture.

Dull orange yellow, mandibles with brown teeth. Head and thorax with black markings as follows: the vertex and occiput within a space bounded by

a line connecting the anterior orbits and an oblique line on each side running from the posterior orbit to the occipital border mesial to the posterior corner of the head. The gular surface has a large black triangular area, broad behind and narrowed in front. The pronotum has two black dots on its upper surface, each in the center of one of its halves. The meso- and epinotum are black, with three large orange yellow spots on the dorsal surface of the former and a similar spot on the angle of the latter. The petiolar scale is black below and dark brown on its anterior surface above.

I have described this beautiful little species from a single minor worker, because its coloration is so striking that it can be readily recognized. It is placed in the subgenus *Myrmobrachys* with some misgivings as it may prove to be a *Colobopsis* when the worker major is brought to light.

\*39. *Camponotus* (*Myrmorhachis*) *bidens* Mayr. Two workers.

40. *Camponotus* (*Myrmorhachis*) *rectangularis* Emery. A single worker.

41. *Camponotus* (*Myrmorhachis*) *latangulus* Roger. Two workers.

\*42. *Camponotus* (*Myrmosphincta*) *sexmaculatus* (Fabr.) var. near *bimaculatus* (Smith), but with the two spots at the base of the second gastric segment confluent.

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## A NEW SPECIES OF *SARCOPHAGA* FROM NIAGARA FALLS.<sup>1</sup>

BY R. R. PARKER,

BOZEMAN, MONTANA.

*Sarcophaga niagarana* new species.

Holotype (male): Collection of writer.

Arista plumose to tip (at least beneath); vestiture of back of head black except for yellowish hairs just below foramen; vibrissæ inserted on line with oral margin; leg vestiture short throughout; anterior and posterior ventral rows of bristles of middle femur not complete; submesotial bristle absent; anterior dorsocentrals and acrostichals present; four pairs posterior dorso-centrals; vestiture of fourth ventral plate decumbent; posterior margin of fourth notum dull orange; genital segments orange-colored, first without marginal bristles (if present, very weak), second bristly.

<sup>1</sup> Contribution from the Department of Entomology, Montana State College, Bozeman, Montana.



*Length*.—10 mm.

*Head*.—Parafontals, genæ and transverse impression dark. Breadth of front at narrowest part about one third eye width; cheek height one third that of eye. Front prominent; frontal vitta at its narrowest part fully twice the width of each parafontal, its sides almost parallel. Second antennal segment blackish, its prominent bristle more than one half length of arista; third segment more than twice length of second; arista plumose to tip (at least on under side). Vestiture of back of head black except for some yellowish hairs just below foramen. Cheek vestiture black and coarse. Gena with a row of hairs or hair-like bristle near lower eye orbit (the two or three lowermost in the holotype quite long). Palpi dark.

*Chaetotaxy*.—Lateral verticals absent; vibrissæ inserted on line with oral margin; each row of frontals extends below base of vitta and diverges from inner edge of gena.

*Thorax*.—Mesonotum clothed with short, reclinate bristles. Spiracular hairs dark, except that tips may be light colored. Epaulets blackish.

*Wings*.—Bend of fourth vein a right angle; anterior cross-vein more basal than end of first longitudinal; third vein with bristles; costal spine absent; sections III and V of costa about equal; calypters whitish, fringed with white hair.

*Legs*.—Dark, vestiture short. Anterior face of posterior femur with three rows of bristles, those of intermediate row few and present on proximal half only; posterior face without ventral row of bristles; femur cylindrical; tibia straight, anterior lateral surface with a single bristle; tarsus not shorter than tibia. Anterior and posterior rows of bristles of middle femur present, posterior present on proximal half only and the two proximal bristles stoutest, anterior row extending slightly farther proximally; submesotibial bristle absent, a single bristle on posterior surface (near medium dorsal ridge).

*Chaetotaxy*.—Anterior dorsocentrals scarcely weaker than the two anterior postsuturals, much longer than vestiture of præscutum; acrostichals present; inner presuturals absent; four pair posterior dorsocentrals, last two the stronger; prescutellar acrostichals present; scutellar apicals present; three sternopleurals; lower sternopleura with bristles only.

*Abdomen*.—Clothed above with short reclinate bristles, beneath with longer, more erect hair. Vestiture of fourth ventral plate decumbent, with long appressed marginal hairs. Posterior margin of fourth notum dull orange.

*Chaetotaxy*.—Second segment without marginal bristles, third with two.

*Genital Segments*.—First dull orange, faintly yellowish polinose, sparse hairy vestiture posteriorly; marginal bristles absent or very weak; second polished, orange-colored, rotund, anteriorly with long slender bristles, posteriorly with shorter hairy vestiture, anal area small. Forceps same color as second segment; base with long, curly hairs, and without upward prolongations; in profile the prongs narrowed near tips, the latter blunt and approximated.

The holotype was taken at Niagara Falls, New York, on June 25, but the year and collector are not recorded.

The genital segments of the type specimen were somewhat dis-



*f* = forceps; *g.s.*<sub>1</sub> and *g.s.*<sub>2</sub> = first and second genital segments; *a.p.*<sub>2</sub> accessory plate.

torted and the claspers were not visible, but the characters of the penis and forceps are sufficiently distinctive to make the recognition of the species easy.



## BEETLES COLLECTED ON A DEAD BLACK OAK IN VIRGINIA.

BY WIRT ROBINSON,

WEST POINT, N. Y.

In the Entomological News for March, 1905, Mrs. Slosson gave an account of the insects found in an old gumbo-limbo log at Miami, Florida, and in the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY for June, 1912, Messrs. Davis and Leng gave a list of the insects which they took upon a recently felled pine at Cleveland, Florida.

During the past summer I was fortunate enough to discover near my home in Virginia a dead black oak with a large insect population and it may prove of interest to contrast the following list of my captures with those mentioned above.

The locality is Buckingham County on James River about 100 miles west of Richmond. The level and fertile bottom land on both sides of the river is under cultivation, but the steeper bordering hillsides are in many places wooded.

At a shady spot where a little stream breaking through these hills supplies a clear pool to which the farm hands resorted for their mid-day rest, there stood a black oak a foot or so in diameter and some thirty feet in height. Under this tree horses had been fed and they had browsed down the underbrush, making about it a small opening. Finally, some thoughtless boy had chopped a belt around the tree and killed it. This had been done about the middle of May, as the withered leaves which still clung to the twigs had not reached full size when death overtook them.

I visited the spot first on July 9 and took a number of beetles, but did not pry off any of the loose pieces of bark, as I was expecting a visit from Mr. Wm. T. Davis and wished to defer a thorough examination until I could make it in his company. On July 12 we visited the tree together and took some thirty-odd species, and on July 23 I passed by late in the afternoon and took a few more.

My list follows:

CARABIDÆ.

1. No. 657, *Amara impuncticollis*, 5 taken under debris at foot of the tree.
2. No. 904, *Coptodera ærata*, very abundant in crevices in the bark.

CORYLOPHIDÆ.

3. No. 3017, *Sacium lunatum*, several taken.

COLYDIIDÆ.

4. No. 3248, *Synchita fulginosa*, one.
5. No. 3255, *Ditoma quadricollis*, four.
6. No. 3272, *Anonium parallelopipedum*, one.
7. No. 3276, *Colydium lineola*, five.
8. No. 3285, *Penthelispa reflexa*, two.
9. No. 3287, *Bothrideres geminatus*, eight.
10. No. — *Cerylon* sp. Differs from *C. castaneum* in shape and punctuation of thorax and in striation of elytra.

RHYSSODIDÆ.

11. No. 3297, *Clinidium sculptile*, three.

## CUCUJIDÆ.

12. No. 3300, *Silvanus bidentatus*, several.
13. No. 3310, *Catogenus rufus*, one.
14. No. 3320, *Læmophlæus biguttatus*, three.
15. No. 3330, *Læmophlæus punctatus*, eight.
16. No. 3349, *Brontes dubius*, three.

## MYCETOPHAGIDÆ.

17. No. 3391, *Mycetophagus punctatus*, three.
18. No. 3393, *Mycetophagus flexuosus*, two.
19. No. 3404, *Litargus sex-punctatus*, five.

## HISTERIDÆ.

20. No. 3516, *Hister vernus*, one.
21. No. 3520, *Hister lecontei*, three.
22. No. 3533, *Epierus regularis*, two.
23. No. 3564, *Paromalus bistriatus*, one.

## NITIDULIDÆ.

24. No. 3725, *Prometopia sex-maculata*, abundant.

## OSTOMIDÆ.

25. No. 3831, *Airora cylindrica*, three.
26. No. 3836, *Tenebrioides mauritanica*, five.

## MONOTOMIDÆ.

27. No. 3869, *Bactridium ephippigerum*, two.

## ELATERIDÆ.

28. No. 4093, *Alaus oculatus*, one.

## BUPRESTIDÆ.

29. No. 4573, *Chalcophora campestris*, three. This species more frequently breeds in sycamore and in sugar maple.
30. No. 4598, *Buprestis rufipes*, one July 9. Usually breeds in sugar maple and in gum in Virginia.

## PTINIDÆ.

31. No. 5350, *Bostrychus bicornis*, four.

## SCARABÆIDÆ.

32. No. 5608, *Clæotus aphodioides*, three.  
33. No. 5609, *Clæotus globosus*, four.

## CERAMBYCIDÆ.

34. No. 5985, *Smodicum cucujiforme*, six.  
35. No. 6443, *Urographis fasciatus*, one.

## TENEBRIONIDÆ.

36. No. 7391a, *Nyctobates barbata*, three.  
37. No. 7413, *Xylopinus saperdioides*, one.  
38. No. 7414, *Xylopinus rufipes*, one.  
39. No. 7546, *Helops micans*, two.

## CALANDRIDÆ.

40. No. 9026, *Cossonus concinnus*, abundant.

## ANTHRIBIDÆ.

41. No. — *Piezocorynus virginicus* Leng, abundant.  
42. No. 9235, *Choragus nitens*, abundant.

This beetle gave me an instructive lesson. The little, rounded, shiny-black creatures were abundant on the bark of the trunk and I could easily have taken a large number, but the casual glance that I gave to the first led me to think that it was a common species of *Triachus* and I therefore took only three, this in spite of the fact that dead bark was no place to find *Triachus* and also that there was such great variation in the size of the individuals. Later in the fall I failed to identify the specimens as belonging to the Chrysomelidæ, and I sent them to Mr. Leng, who was at first misled by my attempt to place them in *Triachus*, but who finally ran them down.

## ACALYPTERÆ (DIPTERA) COLLECTED IN MOBILE COUNTY, ALABAMA.

BY A. H. STURTEVANT,

NEW YORK.

## LOCALITIES.

**Gulfcrescent.** Twenty-five miles northwest of Mobile. Elevation 100 feet. The records are all the result of one afternoon collecting, Nov. 4, 1916. The locality was a sandy hillside, and a stream bordered by a narrow swamp.

**Saraland.** Ten miles north of Mobile. At edge of Mobile River swamp. Oct. 26 and 27, 1916. Two collecting grounds: one was along the banks of a stream and in the open bog near it, just at the limit of the tidewater region; the other was a few miles west, and on a dry sandy hillside.

**Mobile.** All collecting was done the morning of Oct. 24, 1916, along a road through the thick swamp north of the city. Garbage heaps were investigated in this swamp.

**Springhill.** Ten miles west of Mobile. Nov. 1, 1916. Chiefly dry sandy hills, but some specimens from open bogs.

**Coden.** On the coast, ten miles east of the Mississippi line. One afternoon, Oct. 22, 1916. Beach, brackish marsh, and fresh-water bog back half a mile from the shore.

**Kushla.** Eleven miles northwest of Mobile. June and July, 1914; April, 1915; Oct. 18–Nov. 8, 1916. Collecting in various kinds of localities. Fruit and fungi were very carefully examined for *Drosophilidæ*.

## MICROPEZIDÆ.

*Calobata lascivæ* Fabr. Kushla.

## SEPSIDÆ.

*Sepsis violaceæ* Meig. Kushla.

*S. violaceæ similis* Macq. Kushla, Coden.

*S. pectoralis* Macq. Kushla.

PIOPHILIDÆ.

*Prochyliza xanthostoma* Walk. Kushla.

*Piophila casei* Linn. Kushla.

ORTALIDIDÆ.

*Rivellia variabilis* Loew. Kushla.

*Camptoneura picta* Fabr. Kushla.

*Pseudotephritis* van Say. Kushla.

*Chrysomyza aenea* Fabr. Kushla. An Oriental species, recorded from Louisiana by Knab (Science, n.s. 43; 76). I found it common about cut sugar-cane.

*Euxesta notata* Wied. Kushla, Mobile, Springhill.

*Chaetopsis fulvifrons* Macq. Kushla, Mobile.

*Zacompsia fulva* Coq. Kushla, Mobile. I have the species also from Florence, S. C. There is evidently a slip in the generic description given by Coquillett. The third antennal joint is said to be twice as wide as long, but more slender than in *Euxesta*—an obvious contradiction. It should be "twice as long as wide." The error appears also in the table of genera given in Williston's Manual (3d edition, 1908, p. 278). The form differs from all the ten species of *Euxesta* known to me in having no prescutellar bristles.

TRYPETIDÆ.

*Peronyma sarcinata* Loew. Saraland (2 specimens), Kushla (3 specimens), Springhill (1 specimen). The species does not seem to have been recorded since Loew described it from South Carolina. The following notes are therefore presented.

Two subequal orbitals, convergent and slightly proclinate; a third reclinate one near vertex. An inner convergent and a shorter outer divergent vertical. A long, widely divergent ocellar. Postverticals subparallel. One humeral; two notopleurals; one large and one small presutural; one supraalar; two postalars; two dorsocentrals; one scutellar pair. Two mesopleurals; one pteropleural; one sternopleural. A number of fine black hairs on lower and posterior portion of sternopleura. A tuft of small white hairs in center of propleura, and similar hairs scattered over mesopleura; no hairs on pteropleura.

One specimen has only one lower orbital on one side, 3 on the

other. One has two outer divergent verticals. In one the postverticals are black; in the others they are white, sometimes with grayish tips. In some specimens the small supraalar is missing. The posterior notopleural is always on a polished black tubercle.

There is no trace of the third dorsocentral and second scutellar pairs of bristles suggested by Loew. The scutellum has a number of white hairs.

**Oedaspis atra** Loew. Gulfcrest, Saraland, Kushla, Springhill.

**Neaspilota achilleae** Johnson. Saraland.

**Ensina picciola** Bigot. Kushla, Gulfcrest.

**Euaresta bella** Loew. Kushla, Gulfcrest.

**Urellia mevarna** Walk. Kushla, Gulfcrest. My series of this species and of *Ensina picciola* are not uniform in wing pattern. The two wings of the same specimen are frequently different. I am inclined to suspect that some of the species in these two groups that have been based on such differences are not valid.

#### LAUXANIIDÆ.

**Steganopsis (Lauxania) latipennis** Coq. Gulfcrest, Kushla, Saraland.

**Lauxania trivittata** Loew. Kushla, Springhill.

**Minettia valida** Walk. (*Sapromyza macula* Loew.) Kushla.

**Camptoprosopella vulgaris** Fitch. Kushla.

**Trigonometopus reitculatus** Johnson. Saraland (one specimen).

**T. vittatus** Loew. Kushla (two specimens—Oct.), agreeing with the notes made by Knab (*Psyche*, 21: 126) on his specimen from Florida.

#### MILICHIIDÆ.

**Phleomyia pseudodecora** Becker. Saraland.

**P. leucogastra dispar** Becker. Kushla.

?**Phyllomyza approximata** Malloch. Kushla.

#### AGROMYZIDÆ.

**Agromyza virens** Loew. Kushla. This is apparently the form described as *A. gibsoni* Malloch.

?**A. longipennis** Loew. Kushla.



GEOMYZIDÆ.

**Diastata pulchra** Loew. Gulfcrest.

**Mumetopia occipitalis** Melander. Kushla, Gulfcrest.

**Rhinoessa albula** Loew. This is apparently a seashore form. I have collected it also at Key West, Fla.

DROSOPHILIDÆ.

**Aulacigaster leucopeza** Meigen. Kushla.

**Pseudophortica obesa** (*Drosophila obesa* Loew; *Phortica hirtifrons* Johnson). Kushla, on persimmons. The genus *Pseudophortica* is a new one. The following are its characters.

PSEUDOPHORTICA new genus.

Arista plumose. Three large orbitals; upper two reclinate, lower proclinate and situated above middle of front. A pair of large divergent ocellars; two pairs of verticals; a pair of small widely separated convergent postverticals. Front covered with black hairs except at vertex; broad, sides nearly parallel. Face with well-developed carina; clypeus moderately large. A large vibrissa; and a stout bristle on the lower occiput, just above the lower rear corner of the head. Eyes nearly bare.

Two dorsocentrals; one prescutellar; acrostichal hairs in more than ten irregular rows; one humeral; one presutural; two notopleurals; two supraalars; two postalars; two pairs of scutellars, posterior ones crossed; one small propleural; two sternopleurals; mesopleuræ bare.

Several apical bristles on each tibia, those on the second pair larger; a few short stout apical bristles on each of the four basal tarsal joints of the second and third pairs of legs.

Costa twice broken, reaches tip of fourth vein, but is weak beyond third. Auxiliary vein rudimentary, but a shadow continues to distal costal break. Discal and second basal cells confluent. Third and fourth veins slightly divergent at tips. Wing tip rounded. Anal cell and anal vein present.

Type and only species, *Drosophila obesa* Loew.

I have examined the types of *obesa* and of *hirtifrons*, and am certain of the synonymy. I have also seen specimens from Georgia, Tennessee, and Virginia.

**Leucophenga varia** Walk. (*Drosophila quadrimaculata* Walk.).  
Kushla.

**L. maculosa** Coq. Kushla. I have given this as a synonym of *quadrimaculata* Walk. (Ann. Ent. Soc. Amer., 9; 324.) This is an error, due to carelessness in checking up Walker's description.

**Chymomyza amœna** Loew. Kushla.

**C. procnemis** Williston. Kushla, Mobile.

**Mycodrosophila dimidiata** Loew. Kushla. The genus *Mycodrosophila* Oldenberg (Arch. Naturgesch., 80 A, 2, 4) has not hitherto been recognized from North America. *Drosophila dimidiata* Loew., *D. thoracis* Williston, and *D. projectans* Sturtevant all belong here. The genus is characterized by having the anterior pair of dorsocentrals minute or missing, and the distal costal break unusually deep. The known species are all shining black with pale-yellow markings.

**Drosophila affinis** Sturtevant. Kushla.

**D. busckii** Coq. Kushla.

**D. funebris** Fabr. Kushla.

**D. guttifera** Walk. Kushla, Gulferest.

**D. melanica** Sturtevant. Kushla.

**D. melanissima** Sturtevant. Kushla. In October, 1916, I found this species in large numbers around moist sawdust made from a living pine tree (*Pinus palustris*) by a boring beetle.

**D. melanogaster** Meig. Kushla, Mobile.

**D. modesta** Sturtevant. Kushla.

**D. putrida** Sturtevant. Kushla.

**D. quadrata** Sturtevant. Kushla.

**D. repleta** Wollaston. Kushla.

**D. robusta** Sturtevant. Kushla.

**D. sigmoides** Loew. Kushla, Gulferest.

**D. transversa** Fall. Kushla.

**D. tripunctata** Loew. Kushla.

**D. alabamensis** new species.

Arista with 5 branches above and 1 below. Antennæ large, brown; third joint large, oval, dark. Front about one half width of head, wider above; brown, triangle and orbits grayish. "Second" orbital over one half other two, placed a trifle below third. Only one prominent oral bristle. Carina very small, confined to upper part of face; face light brown. Proboscis

brown, palpi dark brown, large. Cheeks brown; their greatest width about one third greatest diameter of eyes. Eyes with short pile.

Acrostichal hairs in 6 rows; no prescutellars. Mesonotum dull brown; humeri, median stripe, pair of stripes in dorsocentral rows, and posterior pair of stripes outside the latter and joining them at the suture, grayish. Scutellum brown, with grayish border. Pleuræ dull brown. Legs yellowish brown. Apical and preapical bristles on first and second tibiæ, preapicals on third.

Abdomen dark dull brown.

Wings clear. Costal index about 2.3, fourth vein index about 2.3, 5X index about 2.0, 4C index about 1.3.

Length body  $2\frac{1}{4}$  mm., wings  $2\frac{1}{2}$  mm.

Holotype: Kushla, Ala., April 9, 1915. Deposited in the American Museum of Natural History.

*Scaptomyza adusta* Loew. Kushla, Gulfcrest.

*S. graminum* Fall. Kushla.

#### EPHYDRIDÆ.

*Mosillus aeneus* Fall. Kushla.

*Paralimna appendiculata* Loew. Kushla, Saraland.

*Ochthera mantis* deGeer. Gulfcrest, Kushla, Saraland.

*O. tuberculata* Loew. Kushla, Saraland, Mobile.

*Parydra quadrituberculata* Loew. Kushla.

There are a number of other Ephyridæ in the collection, not yet identified.

#### CHLOROPIDÆ.

*Elliponeura debilis* Loew. Kushla.

*Chloropisca glabra* Meig. (*assimilis* Macq.). Kushla.

*Diplotoxa microcera* Loew. Kushla.

*D. versicolor* Loew. Gulfcrest, Kushla, Saraland, Coden.

*Ceratobarys eulophus* Loew. Kushla.

*Elachiptera costata* Loew. Kushla.

*Melanochaeta longula* Loew. Kushla.

*M. nigricornis* Loew. Kushla, Mobile.

*Hippelates flavipes pusio* Loew. Kushla.

*H. subvittatus* Malloch. Kushla, Saraland.

*H. texanus* Malloch. Gulfcrest, Kushla, Saraland, Springhill, Mobile, Coden.

*Siphonella cinerea* Loew. Springhill.

*Tricimba (Notonaulax) cincta* Meig. Kushla.

*Oscinella coxendix* Fitch. Gulfcrest, Kushla, Saraland, Springhill,  
Mobile, Coden.

*O. frit pusilla* Meig. (*carbonaria* Loew). Kushla, Mobile.

BORBORIDÆ.

*Borborus equinus* Fall. Kushla.

? *B. neglectus* Malloch. Kushla, Springhill.

? *Leptocera ferruginata* Stenh. Kushla.

Also a number of unidentified species of *Leptocera*.

SCIOMYZIDÆ.

*Sciomyza nana* Fall. Mobile, Coden.

*S. pubera* Loew. Mobile.

*Tetanocera umbrarum* Linn. Kushla, Mobile.

*T. arcuata* Loew. Saraland.

HELOMYZIDÆ.

*Helomyza quinquepunctata* Say. Kushla (April).

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SYNOPTIC KEY TO THE SUBFAMILIES OF MIRIDÆ  
(HEMIPTERA-HETEROPTERA).

BY HARRY H. KNIGHT,

ITHACA, NEW YORK.

In preparing a paper on the Miridæ of Connecticut the writer was confronted with the necessity of preparing suitable keys for the determination of the species. The first big problem was to prepare a workable key for separating the subfamilies and the respective tribes. Reuter (1910) in his "Phylogenie und Systematik der Miriden" has given a classification of the subfamilies and divisions of Miridæ but no other worker has as yet been able to make practical use of his keys. We must give Reuter great credit for pointing out the characters by which the subfamilies should be separated but it is unfortunate he was unable to prepare tables that could be readily

used by later workers. Reuter found that the structures of the arolia, corresponding to the pulvillæ between the tarsal claws of flies, in their modifications showed fundamental relationships between the species and groups within the family.

The present writer has spent much time studying and making drawings of claws and arolia in all the genera obtainable from North America and in this way is able to present a graphic record of the characters used in the classification with the hope that the same may make the keys more usable. Mr. Van Duzee has recently published (Univ. Calif. Pub., Vol. 1: 199-216, 1916) practical keys to the genera of Miridæ but has not made much use of the subfamily grouping.

Dr. W. E. Britton has kindly given his approval to the publication of the present key in advance of the work on Connecticut Hemiptera and it is hoped by so doing, other workers may test it out and suggest improvements.

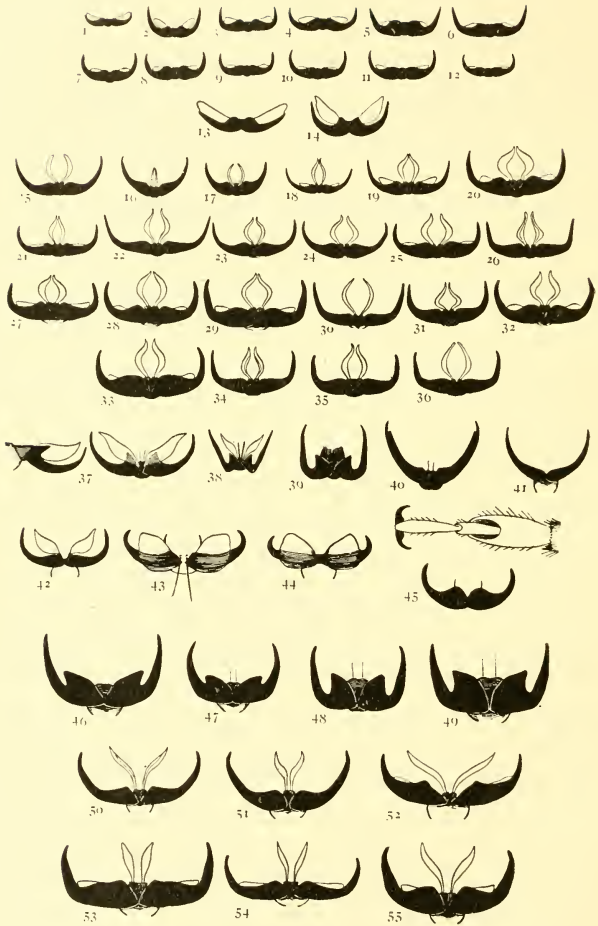
#### KEY TO THE SUBFAMILIES OF MIRIDÆ.

1. Arolia present ..... 2  
    Arolia absent (sometimes two parallel bristles simulating arolia, figs. 47-49) ..... 8
2. Arolia arising distant at the base (fig. 42) or upon the inner angle of the claw (fig. 14); or pseudo-arolia connate upon the inner curve of the claw (figs. 1-13) ..... 3  
    Arolia always arising approximate at the base between the claws (figs. 15-36, 50-55), not connate with them but sometimes minute pseudo-arolia are also apparent on the inner curve of the claw (figs. 27-29, 53-55); free, more or less linear, converging or diverging at the apices ..... 6
3. Prothorax simple, without an annuliform apical stricture..... 4  
    Prothorax with an annuliform apical stricture, sometimes obsolete above in the middle ..... 5
4. Loræ distinctly separated from the genæ; ultimate segment of the tarsi linear, tibiæ generally spinose ..... **Phyllinæ.**  
    Loræ confluent with the genæ; ultimate tarsal segment incrassate (fig. 43), rarely linear, tibiæ destitute of spines ..... **Bryocorinæ.**
5. Loræ linear, distinctly separated from the genæ; ultimate tarsal segment linear, tibiæ finely spinulose ..... **Dicyphinæ.**  
    Loræ confluent with the genæ; ultimate tarsal segment incrassate, tibiæ destitute of spines ..... **Bryocorinæ.**
6. Arolia converging at their apices (figs. 15-36) ..... **Orthotylinæ.**  
    Arolia diverging at their apices (figs. 37, 38, 50-55) ..... 7

7. Claws sharply bent (figs. 37, 38), arolia broadly divergent and more or less thickened ..... **Dicyphinae.**  
 Claws normal, arolia more or less linear, erect and diverging from the apical half (figs. 50-55) ..... **Mirinae.**
8. (1) Prothorax simple, destitute of an apical stricture ..... **Phylinae.**  
 Prothorax provided with an apical stricture, sometimes fine and shallow; when apparent only at the sides an impressed line extends back to the rear of the calli ..... 9
9. Claws simple and slender, rarely spread widely (figs. 40, 41); tibiae not strongly spinose, long and tapering at the apex or else greatly shortened, in the latter case segment I of the tarsi is unusually long, the head transverse and eyes strongly protruding ..... **Cylapinae.**  
 Claws thick, usually sharply curved or bent, toothed near the base or thick and broadly curved (figs. 39, 45-49) ..... 10
10. Pronotum with an apical gibbosely convex area; stricture apparent only at the sides from which an impressed line extends to the rear of the calli ..... **Clivineminae.**  
 Pronotum with an annuliform apical stricture ..... 11
11. Hemelytra hyaline, glassy, ovate, with a sharply defined inverted Y-shaped red or fuscous mark (*Hyaliodes*) ..... **Dicyphinae (pars).**  
 Hemelytra not hyaline or glassy; claws more or less toothed, destitute of arolia but often with two stiff parallel bristles evident between the claws at base (figs. 46-49) ..... **Deræocorinae.**

The writer has found in addition to the arolia which arise normally between the bases of the claws, a translucent horn-like development occurring on the inner curve of the claws to which he has given the name *pseudo-arolia*. In certain species it is perfectly apparent that the pseudo-arolia is nothing more than the thin transparent edge of the claw (figs. 18-20, 27-29, 32, 33, 53-55). In the *Phylinae*, however, this claw development of the pseudo-arolia is so prominent that Reuter and others have referred to "minute arolia" or "arolia connate with the claw." In *Oncotylus* and *Macrotylus* (figs. 13-14) we see the most confusing development of pseudo-arolia. In *Macrotylus* there is an unusual development of the pseudo-arolia and claw, a condition that has been regarded as "arolia attached at the base of the claw." To be true arolia the writer believes the origin of the same should be between the bases of the claws, and not upon the claw. In *Pycnoderes* and *Sixconotus* is seen the most confusing condition of all, arolia or pseudo-arolia being greatly developed and broadly united with the claws. The morphological development of





*Miridæ.*



the arolia and pseudo-arolia offers a good field for investigation and the writer hopes in the future to do some work along that line.

The hamus, a cross vein occurring in the hind wing of Phylini and a few higher forms, is used by Reuter in his diagnosis of the subfamilies. This is an obscure and not easily used character, the writer not finding it necessary or of advantage to use in a key.

EXPLANATION OF FIGURES ON PLATE III.

Figs. 1-12. Claws of PHYLINÆ (Tribe Phylini).

1. *Chlamydatus associatus* (Uhl.).
2. *Reuteroscopus ornatus* (Reut.).
3. *Europiella rubida* (Uhl.).
4. *Microsamma bohemani* (Fall.).
5. *Rhinocapsus vanduzeei* Uhl.
6. *Criocoris canadensis* V. D.
7. *Apocremnus ancorifer* (Fieb.).
8. *Apocremnus* sp.
9. *Campylomma verbasci* (Meyer).
10. *Plagiognathus fuscus* (Prov.).
11. *Plagiognathus annulatus* Uhl.
12. *Microphylellus modestus* Reut.

Figs. 13-14. Claws of ONCOTYLINI.

13. *Onchumenus decolor* (Fall.).
14. *Macrotylus sexguttatus* (Prov.).

Figs. 15-36. Claws of ORTHOTYLINÆ.

15. *Labops hesperius* Uhl.
16. *Semium hirtum* Reut.
17. *Parthenicus vaccini* V. D.
18. *Halticus citri* Ashm.
19. *Halticus intermedius* Uhl.
20. *Strongylocoris stygicus* (Say).
21. *Orthocephalus mutabilis* Fall.
22. *Sericophanes noctuans* Knight.
23. *Alepidia gracilis* (Uhl.).
24. *Pilophorus amannus* Uhl.
25. *Pseudoxenetes scutellatus* Uhl.
26. *Ceratocapsus modestus* (Uhl.).
27. *Lopidea robinia* (Uhl.).
28. *Hadronema militaris* Uhl.
29. *Ilnacora malina* (Uhl.).
30. *Orthotylus flavosparsus* (Sahlbg.).
31. *Orthotylus catulus* V. D.
32. *Orthotylus dorsalis* (Prov.).

33. *Heterocordylus malinus* Reut.
34. *Mecomma gilvipes* (Stal).
35. *Reuteria irrorata* (Say).
36. *Diaphnidia pellucida* Uhl.
- Figs. 37-39. Claws of DICYPHINÆ.
37. *Dicyphus agilis* (Uhl.) (also lateral).
38. *Dicyphus famelicus* (Uhl.).
39. *Hyaliodes vitripennis* (Say).
- Figs. 40-41. Claws of CYLAPINÆ.
40. *Cylapus tenuicornis* Say.
41. *Fulvius brunneus* (Prov.).
- Figs. 42-44. Claws of BRYOCORINÆ.
42. *Monalocoris filicis* (Linn.).
43. *Pycnoderes dilatatus* Reut.
44. *Sixeonotus insignis* Reut.
- Fig. 45. Claws of CLIVINEMINÆ.
45. *Largidea davisi* Knight, claws and hind tarsus.
- Figs. 46-49. Claws of DERÆOCORINÆ.
46. *Cimatlan venatorium* (V. D.).
47. *Eurychlopterella luridula* Reut.
48. *Camptobrochis grandis* Uhl.
49. *Deræocoris ruber* (Linn.).
- Figs. 50-55. Claws of MIRINÆ.
50. *Pithanus maerkeli* (H. S.).
61. *Stenodema trispinosum* Reut.
52. *Zoshippus* sp.
53. *Platytyrellus insitiva* (Say).
54. *Phytocoris lasiomerus* Reut.
55. *Lygus vanduzeei* Knight.

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## CONCERNING LYGÆIDÆ.—NO. I.

BY H. G. BARBER,

ROSELLE PARK, N. J.

Tribe MYODOCHINI Stal.

In Biol. Cent. Amer., 1882, p. 399, Distant described a new genus *Pseudopamera* making his *aurivilliana* the type; eleven years later in the Supplement, 1893, p. 399, he added *Pseudopamera forreri*. The former species in all probability belongs to the genus *Ligyro-*

*coris*, although the ventral strigose lunate vittæ are not mentioned; possibly my *L. pseudohercæus* is synonymous with it. Even if the genus *Pseudopamera* should not fall into synonymy, *P. forreri* has no affinity to it and a new genus must be erected to receive it.

**Cænopamera** new genus.

Type *Pseudopamera forreri* Dist. 1893.

Head slightly longer than wide, lightly exserted; space between base of antenna and eye about three times as long as the postocular space, very lightly and gradually contracted back of the eyes; sides of head before eyes nearly parallel. Antennæ pilose; basal segment incrassate, a little longer than basal segment of rostrum, apex of tylus not reaching middle of this segment; second segment elongate, over twice as long as first, longer than third and fourth together, third segment a little shorter than fourth. Rostrum with basal segment scarcely reaching base of head, second segment longer than third. Pronotum transversely; angularly constricted; impunctate anterior lobe much narrower and twice as long as the posterior profusely punctate posterior lobe, provided with a depressed series of punctures within the anterior margin. Scutellum longer than wide, posteriorly carinate. Clavus with three irregular series of punctures. Costal margin of the corium expanded and concave before the middle. Membrane reaching apex of abdomen. Posterior margin of the metapleura concave. The incrassate fore femoræ provided with two series of spines, the outer series confined to the subapex. The posterior tibiæ provided with a few scattered setose hairs, similar to those of antennæ. Hind tarsus with basal segment about twice as long as second and third together.

*Cænopamera (Pseudopamera) forreri* Dist. Biol. Cent. Amer., p. 399, 1893, Plt. xxxv, fig. 5. Mexico; 8 ♀s Phoenix, Ariz. (U. S. N. M.).

**Zeridoneus** new genus.

Type *Perigenes costalis* Van Duz., 1909.

Head, with the antocular space to base of antenna a little longer than the postocular space, gradually contracted back of eyes. Antennæ almost nude; apex of tylus reaching beyond middle of basal segment. Basal segment of rostrum much longer than basal segment of antenna and about reaching the base of head, second segment longer than the third. Bucculæ extended to line across eyes. Pro-

notum shallowly, obtusely constricted just behind middle, provided with a distinct ring-like collar. Scutellum much longer than wide, carinate throughout, more obscurely so in front. Costal margin of corium not at all concavely arcuated. Posterior margin of the metapleura nearly straight. Incrassate fore femoræ provided with two or three subapical teeth intermixed with several smaller ones. Legs longer than in *Perigenes*. Posterior tibiæ provided with long rigid bristles. Posterior tarsus with the basal segment fully three times as long as the second and third together.

*Zeridoneus (Perigenes) costalis* Van Duz., Canad. Entomol., 373, 1909. Northeastern United States and Canada.

Genus **Ligyrocoris** Stål.

I find myself obliged to retain this genus, although outside of the ventral strigose vittæ the characters are those of *Orthaa* Dall. for most of the contained species. But these finely strigose vittæ seem to me to be a sufficiently definite character to warrant us in keeping this genus distinct.

**Ptochiomera** (*Carpilis*) **ferruginea** Stål.

The genus *Carpilis* was erected by Stål, 1874, from a brachypterous male specimen from Texas to which he gave the specific name *ferruginea*. Apparently the macropterous form was unknown to Stål and is indeed very rare. The long-winged form is very different in appearance from the short-winged form, but an examination of it proves beyond question that it is a true *Ptochiomera*. I have recently received a macropterous female from Prof. H. M. Parshley, taken at Orono, Me. In this specimen the head is imbedded to the eyes, the pronotum anteriorly is without a ring-like collar and is transversely constricted a short distance behind the middle; the anterior lobe is much narrower and twice as long as the posterior lobe. The clavus is distinct, deflected to the corium and provided with three rows of punctures. The membrane is fully developed and reaches to the apex of the abdomen. The second joint of the antennæ is twice as long as the third.

This seems to be a rare species. Mr. J. R. de la Torre-Bueno has taken a ♂ and ♀ (brachypt.) at Yaphank, L. I., Sept., 1911. The ♂ has the anterior tibia armed with a strong, sub-median tooth as in *Ptochiomera puberula* Stål from Texas.

## CHARLES EDWIN SLEIGHT.

By Wm. T. DAVIS,

NEW BRIGHTON, STATEN ISLAND, N. Y.

A real naturalist is generally a born one and the life of Charles Edwin Sleight is only another illustration of the accepted statement. He was born May 26, 1860, in Yonkers, Westchester County, N. Y., and started to make natural history collections at an early age. He attended the public schools, and later became an architect, establishing himself in business at Paterson, New Jersey. In his spare time he took great pleasure in mounting his birds and mammals in natural positions, and was always much interested in the technical part of the treatment and preservation of specimens. Later when he became more of a collector of insects, he devised a cheap and effective type of box for his specimens, a box of the same size for the preservation of alcoholic material in bottles, and a simple plan for mounting small insects on the usual card points. This last consists of an oblong block of wood with two parallel rows of holes about an inch apart. After laying the specimens on their backs in a row on the edge of the block, it is only necessary to apply the freshly glue-tipped point in the usual way and drop the head end of the pin in one of the holes. The insect will thus be held in position while drying, which takes but a few minutes. The Sleight method is a neat and speedy one for mounting small insects, and worthy of being generally followed.

When the warm days of summer came Mr. Sleight often went camping. As he generally had several buildings to look after, he thought it best not to go too far away from home, and so was content to have his camp in some near retreat where he could reach his business when necessary, and ramble about the woods the remainder of the time. Of recent years he had a regular summer camp on the shores of Lake Hopatcong, N. J., to which many of his entomological friends were invited. This was his chief camp, which was also visited by his family, but on occasions one or both of his sons, and generally a friend, would seek some out-of-the-way place for the mystery or adventure that lingers about a forest pond or a lonely valley. It was through Mr. Sleight's coöperation in loaning tents that the camp of entomologists at Lakehurst, N. J., in July, 1909, was made possible, and it was he who suggested the wagon journey devoted to collecting entomological material in northern New Jersey, which took place in May, 1910.

Mr. Sleight was interested in entomology in general, but more particularly in the Trichoptera, and he spent much time in rearing a number of species that frequented the brooks and ponds about his home at Ramsey, N. J. An interesting paper of his observations on these insects is to be found in the *JOURNAL OF THE N. Y. ENTO. Soc.* for March, 1913.

He was a member of the Brooklyn and New York entomological societies, and served the former as its delegate to the council of the New York Academy

of Sciences, to which society he had the honor of being elected a Fellow in 1913. In September, 1913, Mr. Sleight visited the east coast of Florida, collecting at several points from Jacksonville to Key West. At that time he was not in good health and was able to be afield but part of each day. Gradually he grew more feeble, and died at Ramsey, May 20, 1917.

### MISCELLANEOUS NOTES.

**Records of Butterflies from Ft. Wadsworth, Staten Island, N. Y.**—*Basilarchia ursula*, form *albofascinata* Newc. A female was collected, September 4, 1917. Two others have been recorded from Staten Island. See List of the Macrolepidoptera of Staten Island, N. Y., Proc. S. I. Assn. of Arts and Sciences, Vol. III, p. 5, and JOURNAL N. Y. ENT. SOC., Vol. XXIV, p. 93. *Libythea bachmani* Kirt., August 29, 1917. *Papilio cresphontes* Cram., August 26, 1917, and September 2, 1917. The last two species have also been recorded from Staten Island in the list above referred to, but following Dyar's list of 1902 the *Papilio* was there given as *thoas* L., *cresphontes* being at that time considered a synonym.—EDWARD J. BURNS.

***Cicindela abdominalis* Fab.**—On August 5, 1913, a single specimen of this tiger beetle was collected near Bald Hill, southwest of Riverhead, Long Island. On August 21, 1914, seven specimens were collected on a sand path that runs parallel to the Permic River on its southerly side. In August, 1917, no specimen could be found on the sand path, but two were taken near Great Pond, one on the road leading from Riverhead.—WM. T. DAVIS.

***Holcaspis centricola* Osten Sacken.**—From Farmingdale, Long Island, N. Y., Sept. 27, 1917. Found on post oak (*Quercus minor*). When fresh the gall is marked very beautifully with reddish spots. It has been reported from Washington, D. C., New Jersey and Indiana. We have found it on several occasions at Lakehurst, N. J., but never before in N. Y. State.—WM. T. DAVIS.

***Rhodites gracilis* Ashm.**—Collected on rose leaves at Litchfield, Conn., Aug. 25, 1917, by Louis B. Woodruff. This appears to be a rare gall and is figured by Beutenmuller in Bulletin Am. Mus. Nat. Hist., Vol. XXIII, p. 47, and Bull. Br. Ent. Soc., IX, pl. 5, fig. 10. It has been found at Evanston, Ill., and Toronto, Can., on species of *Rosa*. The gall flies were reared in May, 1870.—WM. T. DAVIS.



Camp near Ramsey, N. J.



Starting a Fire at Terrace Pond, N. J.

Charles E. Sleight.





# THE NEW YORK ENTOMOLOGICAL SOCIETY.

Organized June 29, 1892.—Incorporated June 7, 1893.

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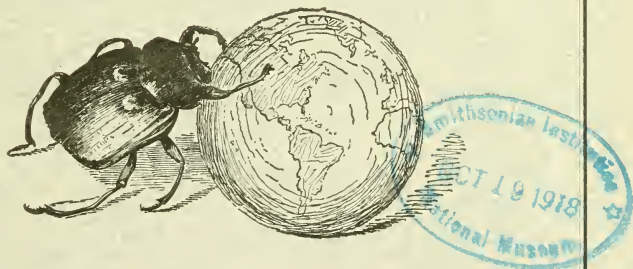
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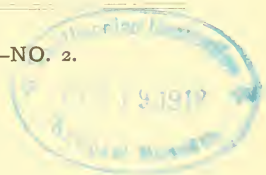
No. 2

### CONCERNING LYGÆIDÆ.—NO. 2.

BY H. G. BARBER,

ROSELLE PARK, N. J.

*Kolenetrus* new genus.



Shining. Punctures set with fine incumbent hairs. Head lightly transverse; across eyes, which almost touch margin of pronotum, wider than anterior margin of pronotum, subequal to anterior rounded submargin; coarsely and closely punctate. Antennæ very shortly pilose; first segment rather short, extended but little beyond apex of tylus; second and third segments subequal. Pronotum a little longer than wide, strongly constricted transversely just behind middle, lateral margins gradually rounded back of eyes, the edge of this margin obtuse, terete; both lobes closely punctate, the central disk of anterior lobe more sparsely so; anterior margin straight, without an impressed collar; posterior margin lightly concave; humeral area nodosely elevated. Scutellum much longer than wide, posteriorly obtusely carinate, punctate elsewhere. Clavus with three regular rows of punctures. Corium rather closely punctate without the median vein; costal margin anteriorly lightly concave. Membrane never entirely absent. Pleuræ coarsely punctate. Posterior margin of metasternum concave. Incrassate fore femur dissimilar in the two sexes, male armed with a single stout post-median tooth, female with two smaller teeth. Fore tibia straight. Hind tibia almost nude, shortly pilose apically. Posterior tarsus with basal joint only a trifle

longer than second and third together. Venter finely and closely punctate, with a coating of fine incumbent hairs.

Type—*Rhyparochromus plenus* Distant, Biol. Cent. Amer., p. 216, pl. XIX, fig. 23, 1882. Central America, Ariz., N. Y. (U. S. N. M.), Mass., Mt. Washington (Mrs. Slosson's coll.), Georgetown, Conn. (A. M. N. H.), Huachuca Mts., Ariz. (my coll.).

Because of the character of the lateral margins of the pronotum this genus should be referred to the tribe Myodochini, closely related to *Ptochiomera* Say. It has no affiliation whatever with the other species listed by American authors in the genus *Rhyparochromus*; in fact this genus does not appear to occur within the United States.

#### **Valonetus** new genus.

Body, antennæ and legs strongly pilose, not shining. Head lightly exserted, a little wider than long, the width across eyes subequal to anterior submargin of pronotum. Basal segment of antenna shorter than basal segment of rostrum, well extended beyond apex of tylus. Bucculæ lightly elevated, running to base of head, first segment of rostrum reaching base of head. Pronotum without any evidence of a collar anteriorly, obtusely constricted just behind the middle; lateral margins obtuse, terete; anterior lobe finely and obscurely punctate, posterior lobe wider and more coarsely and sparsely punctate. Scutellum equilateral. Clavus deflected to corium, with three regular rows of punctures. Costal margin of corium convexly arcuated. Anterior incrassate femur provided with three or four subapical teeth and pilose throughout. Posterior tibia with short pilosity. Posterior tarsus with basal segment longer than second and third together.

Because of the character of the pronotal margins, position of the ventral opaque spots of the fourth abdominal segment and the absence of a collar this genus must be placed close to *Ptochiomera* in the tribe Myodochini.

#### **Valonetus pilosus** new species.

Color ranging from ferrugineous to pale castaneous; posterior margin of pronotum, costal margin of corium, acetabulæ, legs, antennæ and rostrum ochraceous. Head triangular; eyes strongly protruding; preocular sides of head to base of antennæ very short, scarcely longer than the postocular space. Antenna with first segment extended beyond apex of tylus by nearly one-half its length, this segment subequal to third, which in turn is slightly shorter

than second, fourth segment pale castaneous, subequal to second. Posterior lobe of pronotum sometimes a little paler, more coarsely and sparsely punctate than anterior lobe. Scutellum sparsely punctate and apically carinate. Clavus with three regular rows of punctures. Commissure about one-half the length of the scutellum. Corium unicolorous, sparsely punctate, costal margin very lightly expanded and convexly rounded. Membrane decolorous, reaching apex of abdomen. Length 3 mm.

Type—♂ ? U. S. N. M. labelled Tex.; Paratypes—2 specimens from Texas and one labelled Lavaca Co., Tex (U. S. N. M.). The genital segment is so firmly glued to the point that it is impossible to determine the sex of the type. This species resembles a very small pale *Perigenes*.

Genus *Esuris* Stål.

Stål placed this genus, based upon his *E. tergina* from Brazil, in the tribe Lethæaria. I have carefully examined numerous specimens of my *E. castanea* from Arizona and two specimens of the new species described below and can find but two widely separated glandular opaque spots on the side of the fourth ventral segment, placed in reference to each other exactly as they are in the other genera of the Myodochini. I would therefore transfer this genus not only because of the position of the opaque spots but furthermore because the obtuse, terete character of the lateral margins of the pronotum would serve to place this genus among its natural relatives close to *Ptochiomera* in the tribe Myodochini. Furthermore in diagnosing the characters of this genus Stål depended upon the brachypterous character of the hemelytra and the fact that the clavus was connate with the corium. These characters will not serve except for differentiating the brachypterous forms as I have recently discovered in my collection two macropterous females of *E. castanea* in which the clavus is distinct from the corium and the membrane fully developed. I have recently seen a specimen of *E. castanea* Barb. from Ft. Collins, Colorado, in the collection of Dr. E. D. Ball.

*Esuris fulgidus* new species.

Dark brown or piceous, very shining; second and third segments of antennæ, rostrum, apices of femur, tibia and tarsus ochraceous. Head triangular, a little wider than long, across eyes as wide as across anterior submargin of pronotum, finely punctate. Antennæ finely pilose, basal segment piceous, short, scarcely exceeding tylus, shorter than basal segment of rostrum,

second segment one-third longer than third, fourth segment pale castaneous, nearly as long as second. Rostrum with basal segment reaching base of head, second segment considerably longer, a little longer than third segment. Pronotum a little longer than wide, parallel sided, very lightly constricted near posterior margin, disk of anterior lobe impunctate, posterior margin straight. Scutellum wider than long, very finely punctate and not carinate. Clavus connate with the corium, level with it and with four rows of punctures paralleling the scutellum. Corium finely and sparsely punctate, its oblique, truncated apical margin reaching to the fourth abdominal incisure. Membrane entirely wanting. Beneath concolorous with dorsal parts. The incrassate fore femur with two or three minute median teeth. Anterior tibia lightly curved. Length ♀ 2 mm.

Described from ♀ Catal. Sprgs., Ariz., July 4, E. A. Schwarz (Type U. S. N. M.), and ♀ Salton, Calif., H. G. Hubbard Collector (Paratype—U. S. N. M.).

***Ozophora ampliatus* new species.**

Very closely related to *Ozophora unicolor* Uhl. Pale castaneous; lateral expanded margins of corium stramineous; lateral margins of pronotum, antennæ except apex of second and third and all of the terminal segment, rostrum and legs, ochraceous.

Head impunctate; diameter of vertex between eyes about three times as wide as eye itself; ocelli placed closer to the eyes than to the middle point of vertex; viewed from the side, the eyes only slightly higher than wide, not conspicuously emarginate behind. Preocular sides of head to tip of antenniferous tubercles about one half the length of eye, longer than post-ocular space, not contracted back of eyes. Bucculae meeting on an imaginary line drawn across just back of the anterior margin of eyes. Antennæ nude, apices of second and third and all of terminal segment embrowned, not pale ringed; second segment very long, almost twice as long as basal, third one-third shorter, fourth a little shorter than third. Rostrum reaching the intermediate coxæ, basal segment reaching base of head, subequal to basal segment of antenna, a little shorter than second, the latter one-third longer than third segment. Pronotum broad, similar to *O. unicolor*, with a series of punctures behind the depressed anterior margin and within the widely reflexed paler lateral margins; posterior lobe rather closely punctate more depressed than the anterior lobe, the disk of which is impunctate; posterior lobe sometimes slightly paler. Scutellum with the central disk punctate and depressed, posterior to which obtusely carinate; apex not conspicuously paler. Clavus wide, provided with numerous punctures not arranged in regular rows. Pale costal margin of corium rather widely expanded and reflexed, its edge not concavely arcuated. Membrane uniformly embrowned. Legs pale; apical half of anterior femur armed with four equidistant, sharp spines. Hind tibia provided with rigid bristles. Posterior tarsus with basal segment twice as long as second and third together. Length 8.5 mm. Width of pronotum 3 mm.



Type—♂ “Arizona” (Coll. U. S. N. M.); Paratypes—one specimen in collection Acad. Nat. Sci. Philadelphia and one ♀ (my coll.) both collected by Dr. Henry Skinner in Carr Canyon, Huachuca Mts., Arizona.

This species is generally paler than *O. unicolor* Uhler with the terminal segment of the antenna not pale ringed at base. In Uhler's species the width of the vertex of head is not more than twice that of eye, the ocelli are placed almost midway between eyes and central point of vertex, the eye viewed from the side is almost twice as high as wide and plainly emarginate behind, and the head more strongly contracted behind the eyes.

Apparently Mr. Distant was unfamiliar with the genus *Ozophora* as he made no mention of it in the *Biologia Centrali-Americana* and erected two genera synonymous to it. Uhler properly placed Distant's *Davila* as a synonym of *Ozophora* and it appears probable, judging from the characters and illustration, that *Ba'boa* will also have to be referred to the above genus.

*Stygnocoris rusticus* Fall. and *pedestris* Fall.

The former of these two species has been recorded from North America by Horvath, 1908, and from Quebec by Van Duzee in his recent Catalogue. In the collection of the U. S. N. M. is a specimen from St. Johns, Quebec, and recently I have received a specimen from Prof. H. M. Parshley taken at Truro, Nova Scotia. This species has not yet been found within the United States but it should occur in the mountainous parts of New England and New York.

Still another European species, *S. pedestris* Fall., which has not hitherto been reported from this continent must be added to our fauna. I am indebted to Prof. Parshley for a specimen of this species from Truro, N. S., and to Mr. Wm. T. Davis for one from Cape Breton, N. S. Unlike the former species this has been found to occur in the fauna of the United States as Prof. Carl J. Drake has taken three specimens of it at Cranberry Lake, Adirondack Mts., N. Y., Aug., 1917, and four specimens at Elka Park, Catskill Mts., N. Y., Aug., 1917. This is a smaller paler brown, subshining species, with the pronotum less closely punctate and quite pilose; the lateral margins of this part are lightly carinate. The legs are testaceous.

**Acompus rufipes** Wolff.

This is another palaearctic species which must be added to our list of North American species as in the U. S. N. M.; from the collection of P. R. Uhler are two specimens, one labelled "Victoria" [Vancouver Is.] and the other "N. R. R." which probably refers to Northern Pacific or Canadian Pacific of Brit. Col. This species is likely to be confused with *Stygnocoris pedestris*, which it resembles in general appearance. The eyes are however more protruding, the lateral edge of the pronotum is more evidently carinate or lightly expanded and the whole surface of both lobes of this part and the head closely punctate and not at all pilose.

Genus **Rhyparochromus** Curt.

This genus as diagnosed by various European authors and typified by *R. chiragra* Fab. does not appear to occur upon this continent. Yet owing to the diverse interpretation put upon the diagnostic characters of Curtis, this genus has been a sort of dumping ground for numerous species of American hemiptera at one time or another. It becomes necessary then to break up this assemblage of species which has been placed under this genus and assign them to their true affinities. *Rhyparochromus soldalicus* Uhl. (not *soldalicus*, Van Duzee) and *angustatus* Van D. will have to be transferred to the Tribe Beosini and affiliated with *Trapezonotus rufipes* Stål to form a new genus. This gives an assemblage of species falling in a natural group closely related to but structurally distinct from the true *Trapezonotus* which must be retained to include such forms as *T. arenarius* Linn. and *caliginosus* Dist. For this new genus I have adopted the name *Malezonotus* of which *Malezonotus (Trapezonotus) rufipes* Stål must be the type.

**Malezonotus** new genus.

Not pilose. Head transverse, across eyes as wide as anterior margin of pronotum; antenniferous tubercles, seen from the side, strongly oblique. First segment of antenna short, stout, barely exceeding tylus. First segment of rostrum reaching base of head, second segment distinctly longer than third. Pronotum transverse, dull black, unicolorous except most often the lateral explanate margins and sometimes the posterior margin, scarcely or very indistinctly

separated into two lobes, the anterior one impunctate and the posterior one either impunctate or very finely and obsoletely so; lateral margins evenly expanded throughout, most commonly pale and always impunctate, subparallel or very gently converging anteriorly, very lightly or not at all sinuate behind the middle; anterior margin nearly straight; posterior margin strongly sinuate before the scutellum, this margin sometimes more or less pale. Scutellum black, unicolorous, flat, longer than wide, not at all or very finely punctate. Corium pale, more or less suffused with fuscous and finely punctate. Clavus with three irregular rows of punctures. Costal margins expanded, subparallel to each other or very gently rounded. Fore femur incrassate, armed with two or three teeth between middle and apex, one of which is frequently larger. Fore tibia nearly straight in both sexes. Hind tibia with short rigid bristles. Posterior tarsus with basal segment very much longer than second and third together but not twice as long.

Type *Trapezonotus rufipes* Stål. Here also should be placed *Rhyparochromus soldalicus* Uhl. and *R. angustatus* Van D. and a new species from Lakehurst, N. J., described below.

From *Rhyparochromus* Curtis (type *chiragra* Fab.) this genus differs as follows: not pilose, pronotum transverse, lateral margins more nearly parallel and the edge more evenly expanded, both lobes either impunctate or the posterior one must delicately punctate, fore femur not so incrassate and without the very prominent single tooth, rostrum with second segment longer than third, fore tibia nearly straight, posterior tarsus with basal segment not twice as long as second and third segments together.

From *Trapezonotus* Fieb. (type *agrestis* Fall. = *arenarius* Linn.) this genus differs as follows: both lobes of the pronotum concolorous, at most with only the posterior margin pale, lateral margins more nearly parallel, posterior lobe not so coarsely punctate, the fore femora are differently armed, and the anterior tibia more nearly straight.

I have examined twelve specimens of Uhler's *R. soldalicus* from Oregon, Nevada and California. I have recently received a single specimen taken near the Agricultural College Station, Miss., and two others collected by W. L. McAtee at Dyke, Va., which, except for the more infuscated antennæ, I cannot differentiate from Uhler's species.

Prof. John B. Smith in his List of Insects of New Jersey included on my authority *T. rufipes* from Lakehurst, N. J. But after a careful comparison of these Lakehurst specimens with authentic specimens of *rufipes* from Texas in the U. S. N. M., I am convinced that these will have to be placed as a new species.

***Malezonotus fuscus* new species.**

Head, pronotum, scutellum and beneath dull black; apex of third segment and all of fourth segment of antennæ, all of hemielytra except outer anterior margins and membrane, piceous; remainder of antenna, rostrum, acetabulæ and legs rufo-testaceous. Head, as usual, transverse, embedded to the eyes, a little narrower across the eyes than across anterior submargin of the pronotum, finely punctate in front. Antennæ finely pilose, basal segment short, exceeding tylus by one-third its length, about one-third the length of second segment, which is one-third longer than third segment, fourth segment one-fourth longer than second segment. Pronotum, as usual, transverse, with a sparse covering of whitish incumbent hairs; lateral margins pale, not sinuate, subparallel to a short distance behind eyes, where they are suddenly rounded; anterior lobe impunctate, posterior lobe very finely punctate and transversely lightly furrowed just before posterior margin, this margin strongly concave and concolorous. Scutellum closely and finely punctate. Clavus piceous with three somewhat confused rows of punctures. Corium finely punctate, costal edge expanded for the anterior two-thirds, this and area within to subcostal nerve, pale. Membrane abbreviated in brachypterous forms, reaching apex of fifth abdominal segment, entirely piceous. Fore femur provided with a single short post-median tooth, sometimes preceded by a minute tooth. Hind tibia armed with short bristles. Venter very finely punctate. In macropterous individuals the membrane attains apex of abdomen. Length ♂ 3.5 mm.

Described from eleven ♂'s and five ♀'s (all brachypterous) from Lakehurst, N. J., April 2, 1916, collected by sifting the leaves under huckleberry bushes and a single macropterous (Paratype) Smith's Pt., Fire Island Beach, N. Y., VII, 19, 1915, in washup (Coll. of J. R. de la Torre-Bueno). Type ♂ in my collection.

This species is closely related to *M. rufipes* Stål. Besides being generally smaller it differs in that the pronotum is posteriorly transversely wrinkled or furrowed, the hemielytra except outwardly and the membrane entirely infuscated or piceous. *M. angustatus* Van D. differs from the other species of the genus in having the head less transverse, the lateral narrowly expanded edge of pronotum not pale and the hemielytra differently colored. This species is usually brachypterous. I have only seen a single macropterous male labeled

"Cal." in the collection of the U. S. N. M. One of the ms. names of Uhler for *soldaticus* was *oculatus* as a specimen of that species from Ormsby Co., Nevada (collection of C. F. Baker), bears a label to that effect.

***Trapezonotus derivatus* new species.**

Very closely related to and similarly colored as *Trapezonotus caliginosus* Dist. but uniformly larger and the shape relatively more elongated. The head is less transverse; antennæ more pilose, pronotum relatively longer; disk of anterior lobe finely and sparsely punctate with the sides not profusely punctate; lateral margins of pronotum a little more widely expanded; these margins anteriorly straighter and converging more gradually, not being so abruptly rounded back of eyes, the diameter of the submargin just back of eyes only a little wider than head across eyes. This species will average 6-6.5 mm.

Described from four ♂'s and thirteen ♀'s. (Type ♀ my collection.) Huachuca Mts., Ariz.—collected among dead leaves and one ♀ from Ft. Grant, Ariz.—H. G. Hubbard collector, in the U. S. N. M. Both of the above species are closely related to the European *T. ullrichi* Fieb. *T. caliginosus* Dist. also occurs in the Huachuca Mts., Ariz., where I took seven specimens in similar situations to the above species. As indicated by Distant it varies considerably in coloration of legs and antennæ as does *T. derivatus*.

***Trapezonotus diversus* new species.**

Head, anterior lobe of pronotum, scutellum and beneath, black; narrow anterior and lateral margins and posterior lobe of the pronotum, hemelytra anteriorly, narrow anterior margin of pronotum, posterior angle of metasternum and acetabulæ, ochraceous; antennæ with three basal segments, rostrum and legs, ferrugineous; apex of second and third segments and all of fourth segment of antenna, sub-apex of posterior femur, piceous. Apical part of corium and membrane embrowned.

Head transverse, across eyes as wide as anterior sub-margin of pronotum just back of eyes, finely punctate and provided with a rather dense coating of incumbent whitish hairs; antenniferous tubercles visible from above. Antenna rather slender, finely pilose; basal segment short, exceeding apex of tylus by about one-third its length, second segment one-third longer than third, fourth segment about one-fourth shorter than second. Rostrum reaching between middle coxæ, second segment a little longer than third. Pronotum provided with a fine coating of incumbent tawny hairs; lateral expanded pale margins straight, gradually converging anteriorly, gently rounded back of eyes; posterior lobe profusely punctate with fuscous; posterior margin strongly

sinuate. Scutellum elongate, finely and sparsely punctate, with incumbent tawny hairs. Clavus with three irregular rows of punctures, middle row abbreviated. Corium rather closely punctate with fuscous and clothed with incumbent tawny hairs; costal margins anteriorly pale and impunctate; outer lateral margins gently rounded. Membrane unicolorous, extended about to apex of abdomen in macropterous form. Incrassate fore femur, along the outer three-fourths, armed with five or six short teeth tipped with setae, between which are several most minute teeth or serrations. Anterior tibia strongly curved and expanded apically, there armed with a short tooth inwardly. Posterior tibia with two rows of short setose bristles. Posterior tarsus with basal segment only a trifle longer than second and third segments together. Venter finely and closely punctate and clothed with incumbent whitish hairs. Length ♂ 4 mm.

Type ♂, Los Angeles Co., California, from the Coquillett collection in the U. S. N. M.

This is a small species rather closely related to *T. arenarius* Linn., from which it differs in being more narrow, in its clothing of fine incumbent hairs, more slender antennae, with relatively shorter apical segment, punctate head and relatively shorter basal segment of the posterior tarsus. *T. arenarius* introduced from Europe is confined to the mountainous parts of N. E. United States and Canada. The following records for this species may be of interest: Hampton, N. H. (collection of Nathan Banks), Casco Bay, Me., and Claremont, N. H. (collected by G. P. Engelhardt), Top of Whiteface Mt., Adirondack Mts., N. Y. (collected by Wm. T. Davis). The antennae and legs vary in coloration as in the other species from ferrugineous to piceous.

***Sphragisticus simulatus* new species.**

Head, anterior lobe of pronotum, scutellum, fourth segment and sometimes apex of second and third segments of antenna and beneath black; lateral margins and posterior lobe of pronotum, hemielytra, acetabulae and narrow posterior margin of metasternum, ochraceous; first three segments of antenna, rostrum and legs, ferrugineous; posterior lobe of pronotum and hemielytra profusely punctate with fuscous.

Head transverse, across eyes a little narrower than anterior margin of pronotum, impunctate at base, finely punctate in front. Antennae setose; basal segment short, little exceeding the apex of tylus, second segment one-third longer than third, fourth segment a trifle longer than second. Pronotum, with disk of black anterior lobe impunctate, finely punctate in front; pale posterior lobe punctate with fuscous; lateral expanded pale margins provided with a single row of punctures fitted with setose hairs some twelve in number,

these margins almost straight and slightly converging anteriorly to just behind the eyes where they are abruptly rounded; anterior margin almost straight; posterior margin strongly arcuated before scutellum. Scutellum elongate, unicolorous, black, not bivittate with pale, finely punctate on the disk in front and along the margins. Clavus with about four rows of fuscous punctures, the inner rows somewhat abbreviated and confused. The corium rather profusely punctate with fuscous; the costal margin very narrowly expanded and anteriorly impunctate. Membrane embrowned. Rostrum with basal segment reaching base of head, second segment one-third longer than third. Incrassate fore femur armed with several irregular teeth along the outer two-thirds; all of femur sometimes more or less piceous. Anterior tibia gently curved. Hind tibia provided inwardly and outwardly with a row of short oblique bristles and with a row of longer setæ. Hind tarsus with basal segment a little longer than second and third together. Length 4 mm.

Described from three examples ♂ Las Vegas Hot Springs, N. M. (type), ♂ Taos Valley, N. M., and ♀ labelled N. Mex. (Coolidge), all from the collection of the U. S. N. M.

This species is smaller than *S. nebulosus* Fall. the only other member of the genus in our fauna. The scutellum is not, as in *nebulosus*, bivittate with pale, the lateral margins of the pronotum less widely expanded and provided with a greater number of setigerous punctures, the hind tibia have a number of long setæ besides the rigid bristles.

#### *Cligenes delineata* Dist.

No member of this genus has hitherto been reported from the United States. However, in the collection of the U. S. N. M. are four specimens of the above species from Los Angeles and one from Palm Springs, California, and another labelled Texas, Belfrage. One of these bears on the label the ms. name *Beosus* (?) *modestus* Uhler. Distant placed this species in the genus *Salacia* Stål, but as shown by Bergroth (Ann. Soc. Entomol. Belg., 153, 1913) this name is pre-occupied and must give way to *Cligenes* Dist. In this same paper the author gives the synonymy of the closely related genus—*Antilocoris* Kirk.

These two genera containing our smallest Lygeids are readily separated by the fact that *Cligenes* is commonly somewhat shining, not at all or very sparsely pilose; the two lobes of the pronotum plainly separated by an obtuse transverse constriction, the anterior lobe being impunctate; the anterior femur more obviously incrass-

sate and armed with fine teeth; the first segment of the antenna is longer than the basal segment of the rostrum. Both genera belong to the Rhyparochromini.

***Peritrechus saskatchewanensis* new species.**

Head, anterior lobe of pronotum, scutellum and beneath, dull black; antennæ, basal segment of rostrum, legs except apices of femora, middle portion of tibia and basal segment of tarsus, piceous; narrow anterior and lateral margins and posterior lobe of pronotum, two spots on scutellum, hemielytra, narrow anterior and posterior margins of prosternum, posterior margin of metasternum and acetabulæ, ochraceous; second and third segments of rostrum, knees of femora, middle part of tibiæ and basal segment of tarsi testaceous.

Head transverse, across eyes as wide as anterior margin of pronotum. Antennæ finely pilose, first segment short, barely exceeding apex of tylus, second segment one-third longer than third, fourth segment almost equal to second. Rostrum with basal segment reaching base of head, second segment only slightly longer than third. Pronotum very transverse, almost twice as wide as long, black impunctate anterior lobe about equal to the length of pale posterior lobe, the latter punctate with fuscous; anterior margin very lightly arcuate, almost straight; lateral edge carinate, these margins almost straight and converging gradually, abruptly rounded back of eyes. Scutellum longer than wide, fasciate with ochraceous on either side, behind middle, finely and sparsely punctate on the disk, coarsely punctate on either side of the apical portion. Clavus with four irregular series of fuscous punctures, the two inner series confused and abbreviated. Corium except for central discal spot and costal margin anteriorly rather closely and evenly punctate on a pale ochraceous background. Membrane reaching apex of abdomen, pale, mottled with fuscous towards base. Fore femur with a short median tooth, another larger one midway between this and apex, followed by two or three smaller teeth towards apex. Anterior tibia gently curved. Posterior tibia with two rows of short setose bristles, especially towards apex. Posterior tarsus with basal segment almost equal to second and third together. Venter very finely and closely punctate and clothed with fine incumbent hairs. Length ♀ 5 mm.

Type ♀ Oxbow, Saskatchewan (coll. by F. Knab). Paratype ♀ Los Angeles Co., Cal. (coll. by Coquillett), both in the collection of the U. S. N. M.

In the paratype the second and third segments of the antennæ are only black at apex. This species differs from the three other described species in being broader in proportion to length. Further differences are found in the more widely carinate lateral margins of the pronotum which are pale, the edge not at all sinuate; the pronotum



tum is more transverse, the anterior submargin being wider in diameter than the width of head across eyes; first segment of antenna shorter, barely exceeding tylus and less than half the length of basal segment of rostrum.

**Aphanus umbrosus and illuminatus** Dist.

Dr. Horvath was undoubtedly correct in suggesting (Ann. Mus. Nat. Hungar., 561-562, 1908) that Distant's pale legged var. *illuminatus* was a distinct species from his more common widely distributed, all black form—*umbrosus*. While the latter species is pretty generally distributed over the entire United States except possibly the extreme northern areas, the former seems to be confined to the extreme southern part of the country. I have examined a male of this in the collection of the U. S. N. M. from Buck Key, Fla. (G. Brainard collector). It differs from *umbrosus* as follows: the lateral edge of the pronotum more sharply impressed, the posterior lobe and the anterior lobe of the pronotum except the central disk more closely and coarsely punctate, first and apical part of second segment of antenna (third and fourth broken off), rostrum and legs, ochraceous. Uhler commonly referred to *Aphanus umbrosus* as *Microtoma carbonaria* Rossi which is a synonym of *atrata* Goeze.

It is just as well to leave these in the genus *Aphanus* as placed by Horvath in the above named paper, but there is some question in my own mind but what Distant was correct in making these the bases for a new genus (*Dorochosa*) which, because of its preoccupation, was later changed to *Delochilocoris* by Dr. Bergroth.

**Microtoma atrata** Goeze.

I have omitted the above from my key to the Rhyparochromini and I include it in our fauna with some doubt as I have only seen one specimen of it in Uhler's collection (U. S. N. M.). But if Uhler's locality datum is correct this species should be accredited to the United States, for this single male specimen of this species is plainly labelled R. I., undoubtedly meaning Rhode Island. I have carefully compared this with European specimens in my own collection and there is no question of its identity. We cannot altogether trust Uhler's published records for this species as we know that he applied the above name or *M. carbonaria* Rossi to American specimens of *A. umbrosus* Dist., a much smaller species.

**Valtissius** new genus.

Shining. Pronotum and hemielytra sparsely pilose. Head triangular, scarcely transverse, width across eyes almost subequal to width of anterior margin of pronotum. Eyes touching pronotum. Antennæ shortly pilose, set close to eyes, first segment rather long, only a little shorter than third, apical third exceeding apex of tylus, third and fourth subequal. Rostrum reaching posterior coxæ, basal segment reaching base of head, subequal to basal segment of antennæ, second segment longer than third. Pronotum very short and transverse, without semblance of a collar in front, almost twice as wide as long and subequal to length of scutellum, scarcely separated into two lobes, disk of anterior lobe impunctate, posterior lobe sparsely punctate, anterior and posterior margins straight, two lateral margins straight, gradually converging anteriorly, the edge acute, beneath on the propleura with this edge longitudinally, linearly impressed. Scutellum a little longer than wide. Clavus with three regular rows of punctures. Commissure much shorter than the scutellum. Corium rather closely punctate. Moderately incrassate fore femur provided with a few very minute teeth and several long setæ. Hind tibia with a few fine setose bristles. Basal segment of posterior tarsus much longer than second and third together.

Type—*Petissius diversus* Distant, Biol. Cent. Amer. Heteropt., I, 407, Plt. 35, fig. 22, 1893.

This genus having quite different characters than those detailed by Distant for his *Petissius assimilandus*, it becomes necessary to erect a new genus to receive *P. diversus* which as the only representative so far known, becomes the type. Because of the position of the glandular opaque spots of the fourth ventral abdominal segment this genus should be placed in the Lethæini. Distant recorded this species from Panama and Guatemala, Van Duzee lists it for Florida and Texas. I have a specimen from Brazos Co., Texas, presented to me by Mr. Nathan Banks. In the U. S. N. M. is a specimen from Victoria, Texas, and another from Milwaukee Co., Mich., which carries its range far to the north.

**Cryphula** Stål (= **Trapezus** Dist.).

Distant apparently did not recognize this genus at the time he erected *Trapezus*, which is entirely synonymous with the above genus

of Stål. Not only that, but Distant's *T. trimaculatus* is undoubtedly our common *Cryphula parallelogramma* Stål. *Cryphula* (*Trapezus*) *apicatus* described by Distant from Mexico and Guatemala, occurs in the southwestern United States, with the following records: San Diego, Calif., Santa Rita Mts., Ariz., and Ft. Grant, Ariz. (U. S. Nat. Mus.); Huachuca Mts., Ariz., July 20, 1905—20 specimens taken by sifting dead leaves in the cañons (my coll.). This is very closely related to *C. parallelogramma* but besides the differently marked scutellum, the antennæ are shorter, more slender and generally paler. Like the type it occurs in both long and short winged forms.

***Cryphula abortiva* new species.**

General color pale castaneous, darker beneath; narrow costal margins, antennæ, rostrum, apices of the femora, tibiæ and tarsi more ochraceous. Antennæ, whole upper surface and venter, finely pilose. Head nearly as long as wide, impunctate. Basal segment of antenna exceeding apex of tylus by one-half its length, second segment longest of all, one-fourth longer than fourth, third a trifle shorter than fourth. Pronotum, parallel sided, the margins rather abruptly rounded in front and at this anterior rounded angle provided with the usual seta common to the other members of the genus, lateral edge very narrowly carinate, concolorous; posterior lobe concolorous, finely and obscurely punctate; anterior margin straight. Scutellum almost impunctate, concolorous with pronotum, not pale fasciate. Clavus flat, level with the corium from which it is rather poorly differentiated (brachypterous form), provided with four irregular series of fine punctures. Corium rather finely and closely punctate, apex reaching nearly to middle of fifth abdominal segment. Membrane very much abbreviated, reduced to a mere line along inner apical margin of corium. Commissure and inner margin of corium nearly of equal length, forming a straight line with each other, these together nearly equal to the length of the scutellum. Incrassate fore femur unprovided with developed teeth, merely with a few tubercles and long setæ. Hing tibia provided with two rows of four long, rigid, oblique bristles each. Posterior tarsus with basal segment nearly twice as long as second and third together. Length ♂ 3.5 mm.

Type—Brachypterous ♂ in my collection from Huachuca Mts., Ariz., July 20, 1905, where I took it with *C. apicatus* sifting among dead leaves. This species is quite distinct from the other known species. The upper surface being distinctly pilose and nearly concolorous, the scutellum non-fasciate and the membrane almost absent in the brachypterous form.

**Togodolentus** new genus.

Dorsal parts dull. Head not transverse, submerged to eyes, across eyes as wide as anterior margin of pronotum; preocular sides of head to base of antennæ nearly as long as eye. Bucculæ lightly elevated, meeting in an obtuse angle on a line drawn across middle of eyes. Rostrum with basal segment extended to base of head, second segment long, more than one-third longer than third, apex of fourth segment reaching just past middle coxæ. Antennæ very long, slender and nude; first segment long, longer than head, apex of tylus not reaching middle point of this segment, second segment not twice as long as basal, third segment about one-fourth shorter than second, apical segment one-third shorter than third. Pronotum not transverse, rather parallel sided, the lateral edges widely expanded and reflexed, a little widened between the lobes; anterior lobe subquadrate, disk obsoletely punctate; anterior margin lightly concave, submargin depressed and bounded behind by a series of punctures; posterior lobe coarsely punctate; posterior margin strongly concave. Scutellum longer than wide, punctate. Clavus not deflected to corium, widened posteriorly, rather closely and irregularly punctate. Commissure nearly as long as scutellum. Corium flattened, closely punctate; costal margin lamellary expanded, reflexed, pale. Membrane (in brachypterous forms) aborted, exposing fifth and sixth abdominal segments. Anterior femur much incrassate, armed with a few well developed teeth. Anterior tibia nearly straight. Posterior tibia not pilose but provided with a few fine very short bristles. Posterior tarsus with the basal segment twice as long as second and third segments together. Fourth ventral segment of the abdomen laterally provided with but two anteriorly placed opaque spots, therefore this genus should be placed in the tribe Lethæini, close to the genus *Eremocoris*.

**Togodolentus genuinus** new species.

Form narrow ovate. Head except apex, anterior lobe of the pronotum, scutellum, hemielytra except laterally, apex of the third and all of the fourth segment of the antennæ dull fusco-ferrugineous; apex of tylus, two basal segments and basal half of third segment of antennæ, rostrum, explanate lateral margins and posterior lobe of pronotum for the most part, costal margins of the corium, second and third pairs of legs and anterior tibia, ochraceous. Anterior femora, sub-apex of posterior femora and body beneath, castaneous; acetabulæ, posterior margin of pro- and metasternum slightly

paler than the venter. Head impunctate. Antennæ long, basal segment exceeding the apex of the head by more than half its length, relative lengths of other segments stated in generic characters. Pronotum longer than wide, with the anterior lobe subquadrate, disk finely punctate, more plainly punctate just within the laminate, reflexed, pale lateral margins; with a series of punctures just within the rather straight anterior margin; posterior lobe more depressed, closely and coarsely punctate; posterior margin lightly sinuate. Scutellum punctate with extreme apex pale. Clavus flat, level with the flattened corium and punctate in irregular series. Commissure long, almost as long as scutellum. Costal margin pale, expanded, and reflexed. Membrane fuscous, aborted, apical margin scarcely reaching beyond apical angle of the corium. Venter with long setæ posteriorly. Anterior femur with a large subapical tooth, between which and apex are several smaller teeth. Hind tibia with short bristles. Hind tarsus with basal segment twice as long as second and third together. Length ♂ 6.5 mm.

Type ♂ Los Angeles, Co., Cal.; Paratype ♀ same locality (U. S. N. M.).

This has much the appearance of a pale *Eremocoris* but its characters are quite distinct.

#### *Scolopostethus pacificus* new species.

Head, except apex of tylus, anterior lobe of pronotum, except lateral margins, humeral angles and two spots in the middle of the posterior lobe of pronotum, scutellum and sternum for the most part, dull, piceous-black; narrow anterior margin and posterior lobe of the pronotum for the most part, corium behind the middle, extreme apex of second, apical three-fourths of third and all of fourth segment of antenna, anterior and posterior margins of the prosternum, posterior margin of metasternum, acetabulæ and coxæ, ferrugineous-brown; apex of tylus, first segment, basal part of second and third segments of antenna, rostrum, anterior two-thirds of lateral margins of pronotum and propleura, anterior part of hemielytra and lateral spot behind middle, and legs, pale ochraceous. Membrane piceous-brown with a large white spot on either side. Venter shining, dark-castaneous brown.

Head slightly wider than long, finely punctate; eyes not quite touching pronotum, apex of tylus reaching to the middle of basal segment of antenna, second segment twice as long as first, third about one-third shorter than second, fourth segment about equal to third. Pronotum a little wider than long, transversely impressed through the middle, making the two lobes subequal; disk of anterior lobe impunctate, a series of punctures within the lateral edge which is only carinate in front, gradually more expanding posteriorly to become widest at the sinus between the two lobes, behind which it suddenly terminates before the elongate humeral elevation of the posterior lobe; anterior margin depressed, followed by a series of fine punctures; posterior lobe more closely and coarsely punctate. Scutellum with the central

disk depressed and finely punctate, posteriorly obsolete carinate. Clavus with three rows of punctures, the two outer anteriorly converging to form a single row. A little less than anterior half of corium, ochraceous with ferrugineous punctures along veins; more than posterior half of corium embrowned, sparsely punctate, with a large pale spot on either side opposite the apex of the commissure; the entire costal margin rather widely expanded, lightly reflexed and impunctate. Membrane piccous-brown, with some of the veins, particularly at base, pale, with a large white spot at the outer basal angle and another opposite to it at the inner apical angle. Fore femur armed with a single large post-median tooth, between which and apex is a row of four or five minute even teeth. Venter shining, provided with a coating of fine, white, incumbent hairs. Length ♂ 3.5 mm., ♀ 4.5 mm.

Described from 11 ♂'s and 3 ♀'s from Palm Springs, Cal. (coll. by Hubbard); 4 ♂'s and 4 ♀'s Los Angeles Co., Cal., collected by Coquillett in the collection of the U. S. N. M. Type a ♂ from Palm Springs, Cal. (U. S. N. M.). These are all macropterous individuals. This is the largest member of the genus thus far known to our fauna. It is most closely related to *S. atlanticus* Horv., having much the same general markings and armature of the fore femora. But besides being larger, the relative length of the antennal segments is different, the legs and antennæ paler, the pronotum relatively wider, etc.



## NEW SPECIES OF TIPULINE CRANE-FLIES FROM EASTERN ASIA. (TIPULIDÆ, DIPTERA.)

BY CHARLES P. ALEXANDER,

LAWRENCE, KANSAS.

The following new species of crane-flies belonging to the subfamily Tipulinæ have been received from various sources. The Kamchatka material was collected by Dr. L. Stejneger, the Siberian specimen by Dr. Dall. The Japanese crane-flies were included in material sent to me through the kindness of Dr. Akio Nohira, these latter specimens being in my collection, the other material in the collection of the United States National Museum.

I have recently seen a copy of Matsumura's "Thousand Insects of Japan, addition two, 1916," and the following observations on synonymy should be made:

*Nippotipula* Mats. = *Tipula* L.

*N. nubifera* (Coq.) = *T. coquilletti* End.

*Platytipula* Mats. = *Tipula* L.

*Yamatotipula* Mats. = *Tipula* L.

*Daimiotipula* Mats. = *Pedicia* Lat.

*Globericera* Mats. = *Eriocera* Macq.

*Gagamba* Mats. = *Limnophila* Macq. (*Eutonia* v. d. W.).

*G. takei* Mats. = *L. (Eutonia) satsuma* (Westw.).

*Formotipula* Mats. may be a valid genus, and *Togotipula* Mats. may be a valid subgenus of the genus *Tipula*. *Ptychoptera scutellaris* Mats. is homonymous with *P. scutellaris* Meig. and, to judge from the descriptions of the two species, may well be synonymous with it.

#### Genus *Oropeza* Needham.

*Oropeza satsuma* new species.

Male.—Length 11.3 mm.; wing 12.6 mm.

Female.—Length 12.8 mm.; wing 12.7 mm.

#### Alcoholic:

Frontal prolongation of the head short; palpi brown, the last segment largely pale. Antennæ with the scape light yellow; flagellum dark brown. Head brown with a distinct tubercle on vertex.

Mesonotal præscutum dark brown, the humeral angles paler, more yellowish-brown; scutum with the lobes almost entirely dark brown. Pleura yellow, with large brown spots including, also, most of the sternum and the extreme base of the fore coxæ. Legs brown, the coxæ, trochanters and base of the femora more yellow. Halteres pale, knobs darker, the extreme tips pale. Wings with a distinct brown tinge; stigma dark brown; a yellow obliterative mark before and beyond the stigma; inner end of cell 1st  $M_2$  with a similar obliterative streak.

Abdominal tergites with a smooth basal area and a setiferous apical portion; segments light yellow with a broad interrupted median brown stripe, on each segment connected near its anterior end with a transverse bar to form a T. Sternites with the basal glabrous portion dark brown, the apical portion yellow.

Habitat: Japan.

Holotype, ♂, Kyoto, Japan, July, 1916 (Nohira).

Allotopotype, ♀, May, 1916.

This is the first Old World species of the genus to be described.

Genus *Tipula* Linnaeus.*Tipula asio* new species.

Male.—Length 13.3–14 mm.; wing 17.5 mm.

Frontal prolongation of the head rather elongate, yellow, with a narrow brown dorso-median line; palpi dark brown. Antennae short; four basal segments yellow, the apical segments of the flagellum blackish basally, the remainder of each segment a little paler; flagellar segments with the basal enlargement inconspicuous, with about four long verticils that exceed the segment.

Thoracic præscutum gray with three broad grayish-brown stripes that are narrowly margined with darker, the median stripe narrowly bisected; scutum with the lobes largely dark gray; scutellum and postnotum yellow with a narrow brown median line. Pleura gray. Halteres pale at the base, the stem darkened, the knob dark brown, orange at the apex. Legs with the coxæ, trochanters and base of femora yellow; remainder of femora yellowish-brown, the apices dark brown; tibiæ brown, the apical half dark brown; tarsi dark brown. Wings marbled with gray, brown and subhyaline; cell *C* yellowish-brown; stigmal area largely dark brown; a brown spot at the origin of *R*<sub>s</sub> and another in the end of cell *R*<sub>2</sub> and the middle of *R*<sub>3</sub>; base of cells *R* and *M* brownish; remainder of the wings grayish with large whitish spots and blotches; a large blotch extending across the wing near the base; a large spot near the end of cell *M*; other spots at the end of vein 1st *A*, 2d *A*, end of cell 1st *A* and in the anal angle of the wing. Venation: *R*<sub>2</sub> persistent; petiole of *M*<sub>1</sub> short, less than cross-vein *m*; cross-vein *m-cu* obliterated or punctiform.

Habitat: Japan.

Holotype, ♂, Shinaho, Japan, Sept. 9, 1916 (Nohira).

Paratopotype, ♂, Aug. 9, 1916.

*Tipula tateyamæ* new species.

Male.—Length 11.5–12.2 mm.; wing 14–15.5 mm.

Frontal prolongation of the head dark, gray pruinose; nasus short; palpi dark brown. Antennae moderate in length; first scapal segment dark brown; second segment yellowish; flagellum black. Head brownish-gray, paler gray along the inner margin of the eye; a more or less distinct median brown mark on the vertex.

Mesonotum dull yellowish-gray with three præscutal stripes, the median one indistinctly bisected by a pale line; scutum and postnotum gray; scutellum testaceous gray. Pleura clear light gray. Halteres pale brown, the knobs dark brown. Legs with the coxæ dusted with light gray; trochanters dull yellow; femora dull yellow, broadly tipped with dark brown; tibiæ dark brown, the apices narrowly blackish-brown; tarsi dark brown. Wings with a strong reddish-brown suffusion; cells *C* and *Sc* and the base of the wing yellow; stigma small, ill-defined, dark brown; veins dark brown; obliterative streak yellowish, beginning before the stigma, running to about mid-length of cell *M*<sub>4</sub>; a pale suffusion beyond the stigma.



Abdominal tergites dull yellow, the basal segments brighter, on the terminal segments passing into light gray; a broad dark brown median stripe beginning at the base of segment two; shorter sublateral stripes beginning at mid-length of segment two; lateral margins of the tergites broadly pale clay-color; sternites dark brown, the terminal segments blackish-gray.

Habitat: Japan.

Holotype, ♂, Mt. Tateyama, Japan, July 3, 1914 (Nohira).

Paratopotype, ♂.

***Tipula kuzuensis* new species.**

Male.—Length 19 mm.; wing 21.4 mm.

Frontal prolongation of the head rather elongate, dark brown, the nasus prominent; palpi dark brown. Antennæ rather short; scape bright yellow; flagellum almost unicolorous dark brown, the basal enlargements a little darker than the remainder of the segment. Head dull gray, the middle of the vertex indistinctly more brownish.

Pronotum dull yellow, the sides more infuscated. Mesonotum dull light yellowish-gray, the præscutum with the four darker grayish-brown stripes poorly defined; scutum with the lobes grayish-brown; scutellum and postnotum yellowish-brown. Pleura pale, dull yellowish pollinose. Halteres rather short, brown. Legs with the coxæ pale, yellowish pollinose; trochanters dull yellow; femora brownish-yellow, the tips broadly dark brown; tibiæ similar but the tips more narrowly darkened; tarsi with the three basal segments pale yellowish-brown, the apices darkened; last two tarsal segments brown. Wings heavily suffused with yellow, passing into gray on the caudal and apical cells; cells *C* and *Sc* and the base of the wing yellowish; stigma brown, poorly defined; obliterative streak very broad, conspicuous, extending well into the base of cell *M*<sub>4</sub>; similar pale areas at the base of the wing in cells *R* and *M* and in cells *M* and *Cu* at about one-fourth the length of vein *Cu*; vein *Cu* beyond this last mark broadly but indistinctly suffused with brownish.

Abdominal tergites dull yellowish passing into brown on the terminal segments; a blackish sublateral stripe beginning on segment two; lateral margins pale, clay-colored; basal sternites yellowish, terminal sternites dark brown, narrowly and indistinctly ringed caudally with paler; hypopygium dark brown, the outer pleural appendage pale, whitish.

Habitat: Japan.

Holotype, ♂, Kuzu, Province Shinano, Japan, August 4, 1914 (Nohira).

***Tipula bubo* new species.**

Female.—Length 21–23 mm.; wing 19–20.5 mm.

Frontal prolongation of the head light brown; palpi dark brown. Antennæ bicolorous, the three basal segments uniform yellow, the remaining segments yellow with the basal swelling dark brown. Head dark gray.

Pronotum yellowish. Mesonotal præscutum dull brownish-yellow, the usual three stripes gray, the median one broadly divided by a pale line of the ground-color and confluent with the lateral stripes or nearly so; pseudosutural foveæ very deep and prominent; scutum obscure brown, the lobes gray; scutellum and postnotum dull brownish-yellow. Pleura pale, very sparsely whitish pruinose. Halteres light brown. Legs dull brownish-yellow, the tips of the femora broadly, those of the tibiæ narrowly, dark brown; tarsi yellowish-brown, the segments tipped with dark brown, the last two segments uniform brown. Wings with a heavy yellowish-brown to brown pattern; costal and subcostal cells more yellow; remainder of the wings brownish, more gray in the caudal cells; white areas as follows: a broad band before the cord extending from in front of the stigma across the basal half of cell *1st M*<sub>2</sub> almost to the wing-margin in cell *Cu*<sub>1</sub>; base of cells *M*<sub>1</sub>, *M*<sub>2</sub>, and *M*<sub>3</sub> and the apical half of *R*<sub>5</sub> of this color; a large blotch in the middle of cell *M*<sub>4</sub> extending caudad into cell *Cu*; a large blotch in the base of cell *Cu*, indistinctly suffusing the base of the anal cells. Venation: tip of *R*<sub>2</sub> strongly persistent.

Abdominal tergites light yellowish-brown with a broad dark brown sub-lateral band becoming indistinct on the seventh tergite; lateral margins narrowly and indistinctly yellowish; sternites brownish-yellow, the caudal margins narrowly paler and with an indistinct brown subterminal ring. Ovipositor chestnut.

Habitat: Japan.

Holotype, ♀, Akakura, Province Echigo, Japan, August 6, 1914 (Nohira).

Paratype, ♀, Yoshino, Japan, August 2, 1913 (Nohira).

***Tipula aluco* new species.**

Male.—Length 12.5 mm.; wing 11.5 mm.

Female.—Length 14–18 mm.; wing 13–15.5 mm.

Frontal prolongation of the head and palpi dark brown. Antennæ indistinctly bicolorous, the first three segments yellow, the remaining segments of the flagellum having the basal enlargement dark brown, paler brown apically. Head dark.

Mesonotal præscutum grayish with three dark brown stripes, the median one broadest in front, narrowed behind; lateral stripes narrow, slightly curved; thoracic interspaces with numerous tiny brown dots; scutum gray, the lobes with two dark brown marks; scutellum dark; postnotum paler with a delicate brown median vitta. Pleura light-colored with dark brown areas. Halteres pale, the knobs dark brown. Legs dark brown, only the trochanters and the extreme bases of the femora pale yellow. Wings whitish subhyaline with four brown cross-bands that are darkest anteriorly, becoming paler in the caudal cells, the first occupying the base of the wing just beyond the arculus;

the second at the origin of the sector, the third along the cord and the last at the wing-tip; cells *C* and *Sc* dark brown. Venation: tip of *R*<sub>2</sub> atrophied.

Abdominal tergites in the female with the basal segment dark brown, the remaining tergites pale cream yellow, each segment with a triangular brown median mark with the point directed backward; on segments 3 to 8 the disk of the tergites gradually darkens until on the terminal segments only the caudal and lateral margins remain pale; sternites pale with a triton-shaped brown mark on each segment, the points directed backward; on segments 6 to 8 darker colored. In the male the abdomen is paler on the three basal segments, the rest of the organ dark brown, the segments narrowly margined with paler. Hypopygium with the ninth tergite deeply notched medially, the adjacent lobes obtusely rounded; ninth pleurite complete, extensive.

Habitat: Japan.

Holotype, ♂, Kioto, Japan, July, 1916 (Nohira).

Allotopotype, ♀.

Paratopotypes, 2 ♀♀.

***Tipula strix* new species.**

Female.—Length 17 mm.; wing 15.4 mm.

Frontal prolongation of the head dark brown; palpi similar, the tip of the second segment and the third and fourth segments paler. Antennæ bicolourous; scape dark brown; flagellar segments yellow, the base of each segment darkened, less distinctly on the basal segments. Head dark brown.

Head very deep reddish or liver-colored, darker on the præscutal interspaces. Halteres pale, the bases of the knobs a little darker. Legs with the coxæ deep liver-red, concolorous with the pleura; trochanters light yellow; femora bright yellow, tipped with black; on the fore legs the dark tips include the outer half; on the middle and hind legs only the broad tip is darkened; tibiae black, the bases yellowish; tarsi black. Wings whitish subhyaline, sparsely marked with brown; base of the wings light yellow; veins dark brown, *1st anal* slender, yellowish; cells *C* and *Sc* dark brown; stigma dark brown; wing-apex and the outer longitudinal veins narrowly seamed with dark brown; dark clouds at the origin of the sector and along the cord and the outer two-thirds of cell *R*<sub>2</sub>; somewhat paler clouds in the middle of cells *R*<sub>3</sub> and *R*<sub>5</sub>, the base and middle of cells *R*, *M* and *Cu*; tip of cell *M* clouded; gray clouds in the anal cells. Venation: vein *R*<sub>2</sub> persistent; cell *1st M*<sub>2</sub> small, pentagonal; cell *M*<sub>1</sub> deeper than its petiole.

Abdomen shiny liver-brown, the genital segment and the ovipositor more yellowish; ovipositor with the tergal valves acicular, straight, parallel; sternal valves shorter but higher.

Habitat: Japan.

Holotype, ♀, Tokuhara, Province Shinano, Japan, August 31, 1915 (Nohira).

***Tipula kamchatkensis* new species.**

Male.—Length 20 mm.; wing 14.5 mm.

Frontal prolongation of the head moderately elongated, dark brown, with a distinct nasus; palpi dark brown. Antennæ long and slender, dark brown; the second scalpal and extreme base of the first flagellar segment a little reddish; flagellar segment with the basal swelling from two-fifths to one-third the length of the segment, with four long verticils; an additional verticil at about mid-length of the segment. Head light gray.

Thorax discolored, in the type almost entirely blackish, but in fresh specimens probably gray; humeral region and the dorso-pleural membrane yellowish. Halteres brown. Legs with the coxæ dark colored; trochanters yellow; femora light brown, the tips broadly dark brown; tibiæ and tarsi dark brown. Wings subhyaline, costal cell not brighter; stigma large, brown. Venation: cross-vein *m-cu* present, situated near the inner end of cell 1st *M*<sub>2</sub>.

Basal abdominal segments yellowish, the tergites with a broad black median line; tergites four to nine blackish, with the lateral margin broadly yellowish, the caudal margin narrowly silvery. Sternites similar, the caudal margin of the segments narrowly silvery, the spatula on segment eight pale. Hypopygium closely resembling that of *T. pribilofensis* Alex. and related species. Ninth tergite ample, the dorsal surface gently convex, caudal margin evenly and roundly notched, the lateral angles produced into conspicuous chitinized horns; a tiny median notch on the caudal margin, and a pale yellowish median line extending the length of the tergite. Ninth pleurite incomplete, fused with the sternite; outer pleural appendage a very long, slender, cylindrical lobe, that tapers to the blunt apex and is covered with long coarse hairs, meeting its fellow of the opposite side on the median line; inner pleural appendage complex, the caudal angle produced into a slender flattened yellow blade. Eighth sternite produced medially into a broad, flattened, pale, shovel-shaped lobe, the tip with a deep U-shaped notch, which is filled with fimbriate hairs.

Habitat: Kamchatka.

Holotype, ♂, Kamchatka, No. 1255 (L. Stejneger).

***Tipula gynaptera* new species.**

Female.—Length 16.8 mm.

Frontal prolongation of the head moderately elongated, dark gray, the sides reddish-brown, shiny; nasus lacking; palpi dark brown. Antennæ dark brown throughout, the flagellar segments, short, cylindrical, the third segment about twice the length of the second. Head gray with a narrow interrupted brown median line. Eyes very small, not protuberant. A distinct tubercle on the vertex.

Thoracic præscutum light gray, with three indistinct brown stripes, the middle one margined with two cinnamon-brown lines that are better indicated behind. Postnotum blackish. Pleura brownish-gray, the dorsal pleural membranes brown. Halteres short, brown, the knobs distinctly darker. Legs

short and powerful; coxæ dark gray; trochanters brown; femora strongly incrassated, reddish-brown, the tips dark brown; tibiæ brown, the spurs very long; tarsi very short, brown. Wings greatly atrophied, short and broad, about equal in length to the halteres, appressed to the postnotum.

Abdomen reddish with a broad black median stripe on the dorsum that is almost continuous, lateral stripes less distinct. Ovipositor with the dorsal basal shield blackened, heavily chitinized; the dorsal valves of the ovipositor slender, divergent, reddish horn-colored; sternal valves short, the tips pointed.

Habitat: Northeastern Siberia.

Holotype, ♀, Plover Bay, Siberia, July 11, 1899 (Dall). (The Harriman Alaska Expedition, 1899.)

This species is close to *T. whitneyi* Alex. of the Pribilof Islands, off the Alaskan coast. This latter species, however, has the eyes much larger and more protuberant; the antennæ much more elongate, the third segment especially being much longer; the præscutum is without distinct stripes, the second antennal segment reddish, etc.

*Tipula subcentralis* new species.

Male.—Length 20 mm.; wing 20.5 mm.

Frontal prolongation of the head elongate, pale brown, thinly dusted with gray; nasus stout; palpi light brown. Antennæ with the scalpal segments and the first flagellar segment light yellow; remaining segments of the flagellum with the enlarged base black, the stem yellow, on the apical segments becoming more dusky; flagellar segments rather deeply incised, the enlarged bases a little shorter than the apical swelling of each segment. Head gray, the tubercle on the vertex more reddish; a very narrow median brown line extending the length of the head.

Mesonotal præscutum light gray, the usual stripes concolorous, narrowly and somewhat indistinctly margined with brown, the broad median stripe bisected by a brown line; thoracic interspaces with a few short setæ, set in black punctures; pseudosutural foveæ large, triangular, pale in color; scutal lobes gray; scutellum pale brown, with an indistinct median stripe; postnotum brownish, thinly dusted with gray. Pleura gray, the dorso-pleural membrane more yellowish. Halteres pale, the knobs brown. Legs with the coxæ dull brownish-yellow, thinly dusted with a gray pollen; trochanters yellow; femora yellow, a little darkened at the tip; tibiæ yellowish-brown, tipped with darker; tarsi brown, the tips of the metatarsi dark brown. Wings with a brown, gray and whitish pattern, the ground color brown; a large white area beyond the stigma; apex of cell  $R_5$  white; a large irregular blotch before the cord, extending across the sector and across cell  $1st\ M_2$  nearly to the wing margin; a large white area on cell  $M$  and another near the base of the wing; basal half of anal cells conspicuously whitish. Venation:  $R_2$  persistent;  $R_s$  elongate; petiole of  $M_1$  a little longer than  $m$ ;  $m-cu$  obliterated or punctiform.

Basal abdominal tergites rich yellow, with a broad median brown stripe, on the fifth to seventh segments expanded to include most of the segments;

lateral and caudal margins of the segments narrowly silvery; an indistinct brown sublateral line. Basal sternites light brown, the caudal margin silvery, with an indistinct subterminal median brown spot; sternites five to eight much darker, purplish-brown, ringed caudally with silver. Male hypopygium with the ninth tergite hollowed out into a strongly chitinated saucer, the lateral and posterior margins narrowly raised and blackened (as in *centralis* Lw.); the caudal margin is concave and roughened into irregular teeth or denticles; viewed from the side the margin of the tergite shows two teeth at the ends of the rim, the innermost acute, directed dorsad and caudad, the outermost flat, directed caudad. Ninth pleurite complete or nearly so, the ventral caudal angle produced into flattened plates that bear the inner pleural appendages in their concavity; outer pleural appendage flattened, broadly oval. Ninth sternite profoundly incised by a very narrow notch. Eighth sternite weakly carinate, unarmed.

Habitat: Kamchatka.

Holotype, ♂, Kamchatka (L. Stejneger).

Genus *Nephrotoma* Meigen.

*Nephrotoma stejnegeri* new species.

Male.—Length 17 mm.; wing 14 mm.

Frontal prolongation of head short, shiny yellow; nasus slender. Antennæ of moderate length, the first segment yellow, the remainder of the organ dark brown; flagellar segments slender, the basal swelling equal to about one-third the length of the segment. Head orange-yellow, on the posterior part of the vertex and on the occiput with a broad brown stripe.

Mesonotal præscutum yellow with three broad black stripes, the lateral pair straight (as in *lunulicornis*, *aculeata*, etc.), not curved at their anterior ends, crossing the suture and occupying the anterior parts of the scutal lobes; another large brownish-black mark on the posterior inner portions of these lobes; scutellum brownish-yellow; postnotum yellow with a narrow, distinct brown line. Pleura yellow with reddish blotches. Halteres brown. Legs with the coxæ light yellow, the base of the fore coxa reddish; trochanters yellow; femora yellowish-brown, the tips narrowly dark brown; tibiæ and tarsi brown. Wings with a very faint brownish-yellow tinge, the costal cell very indistinctly yellow; stigma oval, brown; veins dark brown. Venation: *Rs* oblique; cell *M*<sub>1</sub> petiolate, the petiole about equal to *r-m*; *m-cu* punctiform, located far before the fork of *M*. In both wings of the type a nearly or entirely complete cross-vein near the end of cell *R*<sub>3</sub>.

Abdominal tergites yellow with a broad blackish-brown median stripe that is narrowly interrupted at the caudal margin of each segment, on segments 7 to 9 occupying almost the entire segment; extreme lateral margins of the tergites with an elongate dark brownish mark, on the basal segments with two such marks, one basal, the other near mid-length of the segment; sternites dull yellow with a narrow brown median line. Eighth sternite dark brown, the caudal margin yellowish. Hypopygium with the ninth tergite rather

small, each half bulging, convex; a V-shaped median notch; outer pleural appendage flattened, elongate, tapering gradually to the apex, the outer face with numerous hairs of moderate length. Ninth sternite deeply notched.

Habitat: Kamchatka.

Holotype, ♂, Kamchatka (L. Stejneger).

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## A REVIEW OF THE GENUS BUPRESTIS IN NORTH AMERICA.

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The genus *Buprestis*, which contains some of the most beautiful and rarest beetles of our fauna, was very much neglected by the early coleopterists. Since Le Conte's revision of the family in 1859, there was no serious attempt made at classification until 1909, when Colonel Thomas L. Casey made an exhaustive study of the genus. The result of this was a multitude of new species, the validity of most of which may be justly questioned by students who demand at least one good, constant character. Common and well known species were split in such a way as to cause one to wonder whether a species was erected on an evident character or on the geographical limits of a state. No one will deny that there is considerable variation in all of these large, brightly colored forms and it has been demonstrated that the amount of food available to the larva influences the development and size of the adult. Mr. W. J. Chamberlin, who has carried on extensive experiments in the breeding of various buprestids, has secured from one female of *Buprestis aurulenta*, a series of forms ranging from entirely green to a uniform bronze. Owing to floods, commerce, etc., infested wood is constantly being distributed over the country. These taken together with the fact that the adults are strong fliers make it absurd to limit each species to a certain restricted area.

Colonel Casey's work has been of considerable value to students of the Buprestidae, as it was the first careful treatise of the group and on account of the many new facts and painstaking descriptions of the species. On the other hand, we feel that there is no good founda-

<sup>1</sup> The arrangement of the authors' names is alphabetical.

tion for the many new species and sub-species described and have taken the liberty of placing his forms in synonymy when no good character could be found to warrant the erection of a species or interpolation of a new name.

"The Buprestis of the ancients, as its name signifies in Greek, was a poisonous insect which being swallowed with grass by grazing cattle, produced a violent inflammation, and such a degree of swelling as to cause the cattle to burst" (Harris). Linnæus applied this name to the family in spite of the fact that none of its members is poisonous and they are rarely if ever taken on grass. The name "burn-cow" has been applied to them by certain English writers, and the French named them "richards" on account of the brilliancy and richness of their colors. The native chieftains in South America evidently admired the colors of some species of Buprestidæ, inasmuch as the elytra of *Euchroma gigantea* were used by them as leg ornaments, a large number being strung so as to form a circlet (Sharp).

In Europe, some species of wasps are known to store their nests with Buprestidæ. Dufour unearthed in a single field, thirty nests of *Cerceris bupresticida* which were filled with several species of *Buprestis*<sup>2</sup> comprising 400 individuals and none of any other genus (Packard). In a fascinating account of the habits of *Cerceris bupresticida*, Fabre quoting Dufour mentions *Buprestis octogutta*, *B. tarda*, *B. bifasciata*, *B. pruni*, *B. biguttata*, *B. micans*, *B. flavomaculata*, *B. chrysostigma*, *B. novem-maculata* as being dug from the cells of this wasp and states that the cleanliness and freshness of the beetles which she buries testify that they are seized just as they emerge from their wooden galleries.

In fossil forms, the family Buprestidæ is rich, no less than 28 per cent. of the Mesozoic beetles found by Heer in Switzerland being referred to this family (Sharp). In Scudder's "Fossil Insects of North America," three Tertiary species of *Buprestis* are mentioned, *Buprestis tertiaria* Scudd., *B. saxigena* Scudd., and *B. sepulta* Scudd., from "Nicola River, below main coal seam, British Columbia," all being represented of course by elytra or fragments of elytra. Scudder states that all "agree closely together but do not seem to be plainly referable to any recent American genus, although approaching nearest *Buprestis*" and that "they seem to be nearly related also to the

<sup>2</sup> Certain species mentioned by Dufour have since been placed in closely related genera and a few in synonymy.



Tertiary species from Sieblos described by Heyden under the name of *B. senecta*." Wickham (Bull. Mus. Comp. Zoöl., vol. LVIII, no. 11) describes two Miocene species from Florissant, Col., *B. florissantensis* and *B. scudderi*.

According to Kerremans, the genus *Buprestis* contains 51 species, scattered over all of the northern hemisphere. Temperate Europe, Siberia, and the United States furnish a large number and two species

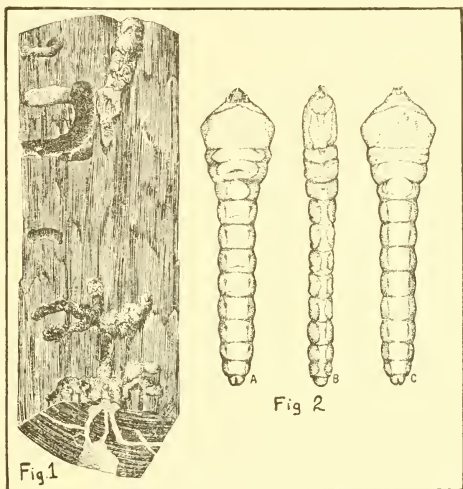


Fig 1. Work of *Buprestis africans* in long leaf pine wood (reduced). (After H. E. Burke in U. S. Dept. Agric. Yearbook, 1909.)

Fig. 2. *Buprestis africans* larva. A, dorsal view; B, dextral view; C, ventral view. (After H. E. Burke in Bull. 437, U. S. Dept. Agric. Bur. Ent.)

extend as far south as the equator. In their catalog of "The Coleoptera of Europe" (1906), Heyden, Reitter and Weise list 13 species, 6 varieties and 7 aberrations and Wollaston in his "Coleoptera Atlantidum" lists one species (*B. bertheloti*) from the Madeiras, Salvages and Canaries, this being exceedingly rare. Several specimens were taken in spider webs in the remote island of Hierro of the Canary Group. There is no representative of the genus in Great Britain.

The larvæ of the Buprestidæ are miners in the tissue of dead, dying and living plants, and on account of the enlarged and flattened prothoracic segment which is common to one type, they have received the names, "flat-headed borers" and "hammer heads." Some live in decaying wood, while others infest orchard and other trees and are of economic importance. Their work in general consists of a "flattened oval, gradually enlarging, more or less tortuously winding mine or wormhole, which when completed widens out into an elongate oval pupal cell. This cell connects with the outer surface by a short, oval exit hole. The mine has its surface marked by fine, transverse, crescentic lines and is usually tightly packed with sawdust-like borings and pellets of woody excrement. The injury may be entirely in the bark, entirely in the wood, or as is usually the case, in both bark and wood" (Burke). These mines may completely encircle the trunk and when this occurs, the circulation of sap is stopped and the tree dies. According to Burke, who has added much to our knowledge of the life history and habits of these insects, the life history in general is as follows.

Eggs are deposited singly during the spring or summer, in crevices in the bark or under the bark at the edge of a wound and the larva mines the inner bark or wood until it reaches maturity, which may be the following or second fall. It then forms a cell in the bark or wood in which it pupates and transforms to the adult. The winter is passed in the larval, pupal or adult stage, and in nearly all cases the adult emerges the following spring or summer. The beetles usually feed on the foliage of some plant, sometimes on that of the host, but often on that of another. After mating and egg-laying, death soon takes place. The beetles are active, fly readily and like to bask in the sunshine. According to Fletcher, a specimen of *B. aurulenta* was found in the act of emerging from its burrow in the wood of a desk which had stood in the Office of Works at Guildhall for twenty-two years.

There are two general types of buprestid larvæ, one, the bark and wood borers, "flat-headed borers" with a long, slender, sub-cylindrical body and the other, leaf miners, with the body flattened, rather oval, deeply notched and gradually tapering to the last segment. According to Burke, both types are distinguished by the following characters. Body composed of thirteen flattened segments. Head small

and more or less retracted into the first segment. Antennæ medium sized, three-jointed; ocelli lacking; labrum large, arched and protruded; mandibles short and strong, usually toothed and rather spoon shaped; maxillæ well developed; maxillary palpi two jointed; labium well developed arched, protruded; labial palpi minute and unsegmented, almost obsolete. First segment with large well developed plate on both ventral and dorsal surfaces; legs absent, ambulatory tubercles sometimes present; cerci absent; spiracles crescentic, one large one on either side of the second segment and one small one on either side of each of the fourth to eleventh segments on the anterior dorso-lateral surface.

The possession of a well developed ambulatory plate on both dorsal and ventral surfaces of the first segment behind the head is the principal distinguishing character of the buprestid larva. Both plates are alike and the dorsal plate has a central line groove or V. Burke states that similar plates occur on some eucnemid larvæ but that the markings on the dorsal plate consist of two lateral lines; that cerambycid larvæ never have the ventral plate as well developed or similar to the dorsal one and that cucujid larvæ are very flat and possess well-developed legs. In Burke's table for separating the genera, the following larval characters of the genus *Buprestis* are given. Larva somewhat flattened, club-like in form; first segment distinctly larger and broader than following segment; last segment without a distinct chitinous fork; plates of first segment with distinct chitinous rugosities; rugosities of first segment pointlike; plates with indefinite margins, markings light, appearing more as grooves than as definite lines; dorsal plate marked by a short trunked inverted Y or U, the apex and trunk of which are often faint, rugose area forming more or less of a hood around the Y; ventral plate marked with a median groove that extends from the posterior margin of the plate two-thirds or three-fourths of the distance to the anterior margin, not bisecting the plate. Burke also states that the larval characters strongly indicate that the genus *Buprestis* should be split into three genera.

The family Buprestidæ is represented in our fauna by eight tribes—*Polycastini*, *Schizopini*, *Thrincopygini*, *Chalcophorini*, *Chrysobothrini*, *Buprestini*, *Agrilini* and *Mastogenini*. The tribe *Buprestini* contains those forms having the hind coxæ with plates distinctly dilated

near the base, the mesosternum divided so that the sternal cavity is formed by the meso- and metasternum and the antennal pores inferior in small pits. The genus *Buprestis* may be distinguished by the following characters—mentum pale, membranous in front; mesosternal suture distinct; posterior lateral metathoracic sclerite uncovered, triangular; prosternal spine obtusely rounded at apex and obtusely angulated behind the front coxæ; scutellum small; elytra regularly striate throughout, moderately narrowed posteriorly, usually marked with yellow; medium sized species.

For those forms (*adjecta*, *sulcicollis*, *aurulenta*, *striata*) having the pronotum uniformly impressed along the middle, labrum more chitinous and metallic at its basal part and a complete absence of true elytral striæ, with the substitution of a few longitudinal ribs separated by wide and uniformly punctured intervals, Casey erects the subgenus *Cypriacis* and for those (*deccora*, *salisburyensis*, *apricans*) with elytra having no vestige of regular discal costæ and but feeble traces of impressed striæ, but in their place a series of large perforate punctures with the general surface closely, deeply and confusedly but evenly cribrate with smaller punctures, while the prothorax seldom has any trace of an impressed line, he has erected the subgenus *Stereosa*. This would divide *Buprestis* into three groups and ratify Burke's conclusion arrived at through the study of the larvæ.

Burke states that the larvæ of *Buprestis* proper "have a small rugose hood around the apex of the V-shaped markings on the dorsal plate of the first segment and very slight rugose markings along the groove on the ventral plate" and that in this group, "pupation takes place in the spring and the beetles emerge soon afterwards." In the subgenus *Cypriacis*, "the rugose hood around the apex of the V is much larger and the rugose area along the ventral marking is broad. Pupation in this group takes place during the summer and the beetles remain in the pupal cells until the following spring." In the subgenus *Stereosa*, "there is no distinct rugose hood around the apex of the V but almost the entire dorsal plate is rugose, as is also the ventral plate. Pupation takes place in the summer and the beetles winter over in the pupal cells."

## KEY TO THE SPECIES.

- 1—Prosternum not or weakly and shortly sulcated, anterior tibiæ of male internally emarginate and armed with a reflexed tooth at apex.....9  
     Prosternum broadly sulcated, anterior tibiæ of both sexes simple.....2
- 2—Elytra punctate-striate (Subgenus *Stereosa* Casey).....7  
     Four or more elytral costæ, suture and margin elevated (Subgenus *Cypriacis* Casey) .....3
- 3—Elytral costæ flat, punctured.....6  
     Elytral costæ convex, their summits polished and not or very feebly punctate .....4
- 4—Third of the true elytral costæ very short, costæ feebly punctate.  
     *sulcicollis* Lec.  
     Third costa long, sutural costa at least impunctate.....5
- 5—Elytra with four costæ, tips of elytra not bidentate, head with median costa .....*aurulenta* Linn.  
     Elytra with eight costæ, tips of elytra sub-bidentate, head with faint median sulcus .....*adjecta* Lec.
- 6—Above, dark, coppery brown .....*striata* Fab.  
     Above with more or less green .....var. *impedita* Say
- 7—Bright green above .....8  
     Color uniform dull cupreous brown.....*apricans* Hbst.
- 8—Tips of elytra bidentate, form narrow elongate.....*decora* Fab.  
     Tips of elytra not bidentate, form short and stout...*salisburyensis* Hbst.
- 9—First segment of abdomen not sulcated.....19  
     First segment of abdomen sulcated .....10
- 10—Elytra with distinct spots or vittæ .....13  
     Elytra immaculate .....11
- 11—Elytra strongly furrowed, often with a dull shine.....12  
     Elytra not strongly furrowed, polished brassy to greenish.  
     *maculativentris* Say
- 12—Black, often with a dull shine.....var. *rusticorum* Kirby  
     Elytra and pronotum uniform green to dull green...var. *subornata* Lec.
- 13—Interstices of elytra alternately convex.....16  
     Interstices of elytra flat .....14
- 14—Elytra each with two vittæ more or less confluent and united.....15  
     Elytra with flavous spots or blotches.....*maculipennis* Gory
- 15—Vittæ brick-red or fulvous, never or at most but slightly united.  
     *lineata* Fab.  
     Vittæ flavous, generally united except at humerus and apex.  
     var. *davisi* n. var.
- 16—Abdomen coarsely punctate, yellow markings of elytra interrupted by striæ, interstices of elytra alternately strongly convex.....17  
     Abdomen feebly punctate, yellow markings of elytra usually not interrupted by striæ, surface smooth and polished, interstices of elytra alternately feebly convex .....*læviventris* Lec.

- 17—Sides of thorax sinuate or parallel, often swollen at base.....18  
     Sides of thorax arcuate .....*nuttalli* Kirby
- 18—Elytral intervals alternately strongly convex, abdomen coarsely punctate.  
     var. *alternans* Lec.  
     Elytral intervals not so strongly convex, abdomen moderately punctate.  
     var. *consularis* Gory
- 19—Elytra green to violaceous blue or bronzed; wholly immaculate or marked  
     with distinct spots or vittæ.....20  
     Elytra green to violaceous blue, entire surface evenly sprinkled with small  
     confluent yellow spots .....*confluents* Say
- 20—Legs metallic or black with metallic lustre.....21  
     Legs wholly or in part pale .....*rufipes* Oliv.
- 21—Elytra green, bluish, purple or bronzed, immaculate or marked with vari-  
     able yellow spots .....22  
     Predominating color of elytra fulvous or reddish with suture or a few  
     spots along suture green .....*viridisuturalis* n. sp.
- 22—Elytra green or bronzed, immaculate or with yellow markings which are  
     never touched with orange .....23  
     Elytra purplish, yellow spot just behind middle and subapical one always  
     touched with orange laterally .....*gibbsi* Le C.
- 23—Elytra and pronotum uniformly green or bronzed, elytra either immaculate  
     or with variable yellowish markings .....24  
     Elytra greenish, lateral margins and pronotum always a brilliant cupreous.  
     *connexa* Horn
- 24—Elytral striæ moderately deep, intervals broad, without a glossy shine.  
     *fasciata* Fab.  
     Elytral striæ deep, intervals narrow, with a distinct glossy shine.  
     var. *langi* Mann.

The following brief descriptions deal only with the essential and striking differences and general appearance of the insects and used in connection with the key, should enable one to locate the species with some degree of certainty.

**Buprestis aurulenta** Linne, 67-661.

*lauta* (Le Conte), 54-17.

*radians* (Le Conte), 54-17.

*villosa* (Le Conte), 73-331.

*fabulosa* Casey,<sup>3</sup> 09-120.

*acmula* Casey, 09-121.

*tacoma* Casey, 09-121.

*nupta* Casey, 09-121.

*venusta* Casey, 09-122.

<sup>3</sup> Described from Mexico, specimens collected by Townsend at Chihuahua.

*prospera* Casey, 09-122.

*affinis* Casey, 09-123.

*adulans* Casey, 09-123.

Elongate, sub-oval. Elytra pale green to ultramarine, suture and lateral margins generally cupreous but absent in extreme forms, feebly inflated sub-posteriorly, tips not bidentate, four elytral costæ, suture and margin elevated, elytral costæ convex, their summits polished and not punctate. Antennæ metallic green or bronzed. Head and pronotum green with more or less bronze at sides, head deeply and confluent punctate with a distinct median costa, pronotum deeply, densely but distinctly punctate, more or less impressed medially. Beneath metallic green or bronzed, prosternum coarsely and densely punctate, abdomen finely punctate. Male slightly narrower than female and having abdomen more closely punctate, abdomen of female sparingly punctate. Tip of abdomen sub-truncate in both sexes. Length 14-19 mm.

RECORDS.—Yellowstone Park, July 21 (Zabriskie); WYOMING. Divide, Lane County; Ashland; Sulphur Springs, August 2 (Jones); Dilley; Corvallis, May (Green); Ranier, July, August; Coast Mts., April (Chamberlin); OREGON. Priests River, June 21 (Wickham); Atalanta, June, 7800 ft.; IDAHO. UTAH (Barfoot). Santa Fe (Snow); Gallinas Cañon (Snow); Las Vegas (Ward); Las Vegas Hot Springs (Schwarz & Barber); NEW MEXICO. Carrville, Trinity County, July 1 (Van Dyke); San Bernardino Mts., July 3 (May); Camp Nelson, Tulare County, 4700 ft., August 1 (Beardsley); Quincy, July 1 (Radcliffe); Mendocino County; Mt. Lowe, August 8 (Coxey); Tulare County; Sylvania, Huckleberry Meadow, Fresno County, August; McCloud, July 2 (Van Dyke); Yreka (W. Duenkel); CALIFORNIA. NEVADA. MONTANA. ARIZONA. Yuka, August; COLORADO. Port Townsend, August (Seaton); Seattle, July; WASHINGTON. Victoria, B. C., July 20 (Osborne); Vancouver Island, B. C., July 7 to 12; Calapooia Mts., 1400-1600 ft., August 11; Kamloops, B. C.; Beaver Mouth, B. C., July 14; CANADA. Common from Br. Col., to southern California. (Chamberlin.) Breeds in Douglas fir, yellow, lodge pole, sugar and Monterey pine and western red cedar (*Thuja plicata*). (Chamberlin.) This species mines yellow pine and Jeffrey pine in the Rocky Mountains and Pacific States. Injury similar to that of *Buprestis apicans*. Entrance is made through wounds in the bark. Lightning struck trees are especially subject to attack. Adults emerge in spring and early summer. (Burke.)

Mr. W. J. Chamberlin informs us that he has bred extensive

series of this insect and that all of the various species from the Pacific Coast, erected on size, color and individual variations are nothing but extreme forms. From one female he secured a series showing an extensive enough variation in size, shape and color ranging from entirely green with no cupreous markings to entirely cupreous, to warrant the above synonymy. *Aurulenta* is very common along the Pacific Coast and one of our most beautiful buprestids.

Mr. Gilbert Arrow states that there are no European specimens of this species in the British Museum and knows of no reason for supposing that it occurs in Europe. Kerremans also treats it as a strictly American insect. This will make *B. lauta* of Le Conte a synonym and correct the present mistaken idea that *aurulenta* is European. Van Dyke states that the form *villosa* described by Le Conte is identical with *aurulenta* except for its more pubescent prosternum which character is very variable and by means warrants the erection of a species.

***Buprestis adjecta*** (Le Conte), 54-17.

*brevis* Casey, 09-118.

*intricata* Casey, 09-118.

Stout, more oval than preceding. Elytra entirely deep or light green with a faint brassy luster; suture and lateral margins often narrowly cuprescent; tips bidentate, elytral costæ intermediately elevated, convex, their summits polished and not punctate. Antennæ dark, more or less metallic. Head and pronotum green, often with a brassy tinge, densely punctate, head with a distinct median sulcus, pronotum not, to distinctly impressed along median line, broadly rounded at sides. Beneath metallic with a distinct cupreous shine, prosternum and abdomen coarsely and densely punctate, scarcely truncate. Length 13-18 mm.

RECORDS.—Gallinas Canon (Snow); NEW MEXICO. IDAHO. Tahoe Tavern, July 10; Tallac, elevation 6300 ft., July 16 (Reynolds); Weed, July 20 (Chamberlin); Sierra Nevada Mts.; CALIFORNIA. Ft. Klamath; Oregon (Packard), (Chamberlin), OREGON. WASHINGTON (Leng Coll.). NEVADA. Bullion Peak, August (Oslar); Manitou, August; Colorado Springs (Wheeler); COLORADO. National Park; WYOMING. Beaver Foot Range Rocky Mts. (Wenman); Peachland, B. C., August; Field, B. C., August 1 (Brown); Vancouver; CANADA. Ohau, Honolulu, one specimen on flowers (Blackburn & Sharp); H. I. Occurs from Washington to Tulare County, California. (Chamberlin.) Probably breeds in yellow, Jeffrey and lodge pole pine. (Chamberlin.)



This species appears to be both local and rare. Few of our eastern collections have it represented by more than one or two examples. The two forms (*intricata* and *brevis*) described by Casey have no good constant characters and should be placed in synonymy.

**Buprestis sulcicollis** (Le Conte), 59-208.

*lateralis* Casey, 09-119.

Convex. Elytra obliquely narrowed and slightly prolonged at apex, uniform, dull, dark, coppery brown usually with a very slight tinge of green, four elytral costæ, suture and margin elevated, third of true elytral costæ very short. Antennæ dark, first two segments bronzed. Head and pronotum dark coppery brown, latter deeply channeled, pronotum becoming arcuate toward base. Ventral surface dull cupreous, densely punctate, punctures of prosternum coarse, those of abdomen fine, tip broadly rounded. Length 13-15.5 mm.

RECORDS.—Lake Superior (Le Conte). Monmouth, June 24; Paris (Frost); MAINE. Hampton (Shore); NEW HAMPSHIRE. Marquette, June 25 in wash up (Sherman); MICHIGAN. Keene Valley, Essex County, July (Notman); NEW YORK. NOVA SCOTIA.

Food plants, white and pitch pine.

This species is exceedingly rare and appears to be confined to the northeast. The occasional records from Florida and the south undoubtedly refer to the true *Buprestis striata* which is also a uniform dark coppery brown above, but which is easily separated by the characters given in the key and also by the pronotum not being channeled as it is in *sulcicollis*. Dr. E. C. VanDyke who examined the type in the Le Conte collection finds that it is not a brassy green insect as claimed by Casey but of a uniform dull, coppery brown with a very slight greenish reflection. This places the dark form described by Casey as *lateralis* in synonymy.

**Buprestis striata** (Fab.), 75-267.

*obscura* Casey, 09-125.

Elongate. Elytra dark coppery brown with a cupreous shine, four elytral costæ, suture and margin elevated, costæ flat and punctured, intervals densely, coarsely and confluent punctate. Antennæ greenish, more or less bronzed. Head and pronotum uniform dark coppery brown with a cupreous or brassy luster. Head and pronotum densely and coarsely punctate, sides usually parallel, slightly sinuate, rarely arcuate or broadened posteriorly. Ventral surface and legs bronzed or cupreous. Prosternum densely and coarsely, abdomen, finely punctate. Male narrower than female with tips of abdomen more broadly rounded. Length 13-20 mm.

RECORDS.—WEST INDIES. Vowell's Mill (Coverdale); LOUISIANA. La Grange, Brevard County; Jacksonville, beaten from pine saplings (Dury); FLORIDA. TEXAS. Cobham; VIRGINIA. Southern Pines, May, September (Manee); NORTH CAROLINA. GEORGIA. Lakehurst, May 28 (Davis); Ft. Lee, in hemlock (Joutel); Newark; Westville (Liljeblad); Da Costa, May 30 (Smith's List); Alloway, July (Hornig); NEW JERSEY. Minnewaska, Ulster County, July 27, from dead pine (Nicolay); Valhalla, April 2 from pitch pine (Schott); Keene Valley, Essex County, June, July, August (Notman); NEW YORK. Cincinnati (Dury); OHIO. Hummelstown, May 5, April 1 chopped from *Pinus rigida* log (Knull); PENNSYLVANIA. Cook County; ILLINOIS. Mineral Springs, July 4, under bark of living tamarack (Wolcott); Pine, May 3; Miller, July 2, 15, August 7 (Liljeblad); INDIANA. Pentwater, August 20 (Liljeblad); Pequanning, August 10, ovipositing on pine (Hebard); shore of Keweenaw Bay, August 10 (Hebard); MICHIGAN. St. Louis, November 27; MISSOURI. May 4, June 5 (Blanchard); MASS. Sanborn, July 16; NEW HAMPSHIRE. Quebec, August 5; Levis County (Roy); Terrebonne County (Hausen); Montreal Island (Chagnon); Vaudreuil County, July (Winn); CANADA. From pitch pine cordwood, Oct. 27, Nov. 22; from late March to early April among needles of young long leaf pine; mid April to early May rather active and often above reach on denuded trunks of blasted pines where they mate and oviposit. (Manee.) Dug from white pine stumps. (Blanchard.) Remains in wood as adult from late October to spring and emerges in early April, seeks pine in its second death year. (Manee.) Larva sometimes found in sound pine logs but more frequently in decaying stumps. (Saunders.) Appears upon pine and spruce trees in May and June; prefers dead wood of logs and stumps to living trees; has been met with in two instances at the tips of the limbs of young spruce trees and probably feeds upon young tender buds of pine and spruce. (Fitch.) According to "Insect Life" (Vol. II, p. 369), *Buprestis striata* is mentioned as having been received from T. C. Harris, Raleigh, N. C., together with the statement that it had been found in a clothing store and had died after cutting eight holes through a pair of heavy woolen pantaloons. The editor replied that it had probably emerged from wood-work and had cut the clothing in an effort to escape.

Food plants, *Pinus strobus*, *rigida* and probably all the southern yellow pines.

**Buprestis striata** var. **impedita** Say, 36-160.

*canadensis* Casey, 09-124.

Identical in form and structure with preceding. Separated by dorsal surface being more or less green with suture and sides of elytra cupreous, pronotum and head green with bronze luster. Ventral surface and legs bright green to bronzed cupreous. Length 13-17 mm.

RECORDS.—South Paris (Frost); Waterford; Cumberland County, July 8 (Nicolay); Monmouth, June 23, ovipositing beneath chip protruding from scarf of a white pine stump cut previous winter (Frost); MAINE. Sanborn, July 16; NEW HAMPSHIRE. MINNESOTA. Essex County (Wiltbank); Bayshore, Long Island (Shoemaker); Catskill Mts.; NEW YORK. Ft. Lee; NEW JERSEY. Hummelstown, April 1, chopped from *Pinus rigida* log (Knull); State College, May 13 (Knull); Rockville, April 24 (Champlain); PENNSYLVANIA. Horn Mtn. Club (Sherman); Marquette, June 25, in wash up (Sherman); MICHIGAN. Sudbury, Ont.; Hymens, Ontario, Sept. 1; CANADA.

The fact that the variety occurs with the true *striata* prevents it from being regarded as a good geographical race. In a large series there are indistinguishable intermediates which prevent the raising of *impedita* to specific rank. *Impedita* should be placed in collections as a distinct color variety of *striata* but we believe the line should be drawn here. In our experience this species is never met with in numbers but Sherman has taken it quite commonly in wash up along the shores of Lake Superior during June.

Shelford in his work "Color and Color Pattern Mechanism of Tiger Beetles" (Ill. Biol. Mon., Vol. III., No. 4) concludes that the brilliant colors of the group are due to thin surface films of material having the properties of metals. Prof. Michelson is inclined to attribute differences in the colors to differences in the chemical constitution of the film and color changes during ontogeny to changes in chemical constitution but states that this would be difficult to demonstrate on account of the minuteness of the film. In view of this, it is extremely probable that buprestid colors and color changes are due to similar causes.

**Buprestis apricans** Herbst, 01-125.*nigricornis* (Sturm), 26-105.*bosci* Castelnau & Gory, 37-146.*cribripennis* Casey, 09-127.

Oblong, oval. Elytra uniform dull cupreous brown, punctate-striate. Antennæ dark, first two segments bronzed. Head and pronotum coarsely densely and confluent punctate. Sides of pronotum slightly arcuate. Ventral surface cupreous with greenish reflections, prosternum coarsely and densely, abdomen more finely and distinctly punctate. Tip of abdomen truncate and subsinuate in male, broadly rounded in female. Length 16-23 mm.

RECORDS.—Southern Pines, April 25, May 9 (Manee); NORTH CAROLINA. Grand Bay; ALABAMA. SOUTH CAROLINA. Vowell's Mill (Coverdale); LOUISIANA. Jacksonville, beaten from pine saplings (Dury); Deep Lake, April 12 (Davis); FLORIDA. Tyler County; TEXAS. Billy's Is., Okefinokee Swamp (Bradley); GEORGIA. Late March to early April among needles of young long leaf pines, probably feeding; mid-April to mid-May on dead blaze of big, living long-leaf pines. Oviposits exclusively in cracks of dry dead spots or blazes of large living long leaf pines. (Manee.) Known as the flat-headed turpentine heartwood borer. Injures longleaf pine of Southern States when boxed for turpentine, fire-scarred or otherwise injured. Larval mines are oval, 6×10 mm. in diameter and wind back and forth through sapwood and deep into the heartwood. This shortens the life of the tree as a producer of turpentine and spoils part of it for lumber. Trees often so badly riddled that they are broken over by the wind. Adults emerge during late winter and spring. (Burke.)

There is nothing in the description to warrant the retention of the name *cribripennis* even as a slight variety. The species is southern and rarely taken north of the Carolinas. It is probable that a record such as one from New Jersey (Boonton, N. J.), Jan. 31, under bark of dead pine (G. M. Greene), refers to a straggler and should not be included in the regular distribution of the species.

**Buprestis decora** (Fab.), 75-217.

Elongate, narrower than preceding species. Elytra punctate, striate, green or occasionally with a distinct indigo-blue median vitta, suture and lateral margins always cupreous, tips bidentate. Antennæ black, slightly metallic, first three segments light green. Head and pronotum green, often with a cupreous luster, densely and coarsely punctate, pronotum occasionally

with a faint median sulcus, more often entirely wanting, widest at base, gradually narrowing toward apex, about two-thirds wider than long. Ventral surface and legs entirely greenish to bronzed, densely punctate, punctures of prosternum coarse, those of abdomen fine. Ventral surface of male slightly more hairy, tip of abdomen truncate and subsinuate, that of female subtruncate. Length 11-18 mm.

RECORDS.—Southern Pines, April 6, May 7 (Manee); Wrightsville, April 6 (Davis); NORTH CAROLINA. Grand Bay, April, March (Loding); Taylor Co., April (Genung); Mobile, March (Loding); ALABAMA. Jacksonville, beaten from pine saplings (Dury); Big Pine Key (Davis); Orlando (Pearsall); FLORIDA. LOUISIANA. Thomasville, April 1 (Hebard); GEORGIA. Tyler County; TEXAS. Cobham; VIRGINIA. Gloucester County; NEW JERSEY, PA. Little Rock; ARK. Larvæ and adults split out of rotted pine railway ties in late October; in December, they may leave their fuel home on account of the warmth of the woodbox; from mid-March to early May among needles of young long-leaf pines probably feeding; in May on denuded trunks of dead and semi-decadent pines; an occasional stray specimen in June. Remains in wood as adults from late October to spring emerging about March 1. *Decora* prefers rotted pine. (Manee.)

This species is not at all rare in the south and on account of its remarkable constancy in color, form and size, can be readily distinguished from all other species.

***Buprestis salisburyensis* (Herbst), 01-174.**

*ultramarina* Say, 36-160.

Short, oval. Elytra with practically the same markings as those of preceding species, tips rounded, not bidentate, only about two-thirds longer than wide. Antennæ blackish green, first two segments bronzed. Head and pronotum as in *decora*, pronotum shorter, sides more arcuate. Beneath, similar to *decora*. Length 11-14 mm.

RECORDS.—Southern Pines, March 26 (Leng); NORTH CAROLINA (Horn Coll.). GEORGIA (Le Conte). Da Costa, July 4 (Skinner); Clementon, May 7 (Coxey) (G. M. Greene); Sumner, May 13 (Coxey); Lakehurst, April 30 (Davis); Sea Isle, May 24 (Boerner); Westville, April 19; Atlantic City, June 28 (Smith List); Gloucester, April 20 to May 5 (Tolman); NEW JERSEY. Carlisle Jc., August 9 (Champlain); Southwestern Pa. (Hamilton); PENNSYLVANIA. WIS-

CONSIN. Sandy Plain near Au Sable Forks (Leng), June; NEW YORK. May, rare (Blanchard); Mass. Breeds in pine. Beaten from pitch pines and split from pitch pine knot. (Blanchard.) Food plant, *Pinus rigida*.

This little species is one of the first if not the first buprestid to appear during the spring in the Atlantic States. It is by no means common but can be beaten from the needles of young healthy pines. The earliest record for New Jersey is April 14.

**Buprestis maculativentris** Say, 24-272.

*sexnotata* Castelnau & Gory, 37-129.

*maculiventris* G. & H., 69-1378.

*lecontei* Saunders, 71-40.

Elongate, slightly oval. Dorsal surface polished green to bronzed, shining. Elytra moderately smooth and evenly convex, not strongly furrowed, sparingly punctate. Head densely and coarsely punctate, usually with a small yellow spot above and with one or more spots between the antennæ. Antennæ bronzed to greenish. Pronotum coarsely densely and unevenly punctate with a smooth median line. Anterior angles generally with a slight touch of yellow but often immaculate, sides parallel, straight or broadly arcuate at or before the basal half. Ventral surface and legs bronzed to greenish, deeply densely and evenly punctate, immaculate except for a row of lateral yellowish spots on abdomen. Length 14-20 mm.

RECORDS.—Jackman (Harvey & Knight); Harrison, July (Pollard); Monmouth, June 24, from dead stump of *Abies balsamea*, July 16 (Frost); Redding, July 14 (Frost); Wales, July 14 (Frost); MAINE. Summit Mt., Washington, July 2, 6290 ft. (Dodge); White Mts.; Sanborn, July, August; Jefferson, August (E. D. Harris); NEW HAMPSHIRE. Lowell (Blanchard); Hubbardston; MASS. Catskill (Joutel Coll.); Whiteface Mtn. Trail (Davis); Saranac Lake (Leng); Wilmington, August (Davis); Lake Placid, July 10 (Felt); Keene Valley, July, August (Notman); NEW YORK. PENNSYLVANIA. Putnam Co., rare, June 18; INDIANA. Pequaming, August 14 (Hebard); Point Abbaye, August 13 on hemlock (Hebard); Isle Royal; Marquette, June 25, common in washup (Sherman); MICHIGAN. Duluth (Doggett); MINNESOTA. Keshena (Skinner); WISCONSIN. Mac Nabs Island; Nova Scotia; Halifax; Cape Breton (Leng); Hudson Bay Territory, Lake Superior; New Foundland (Le Conte); Victoria Beach; Winnipeg. Man., August 7 (Wallis); Grimbsy, Ont., July 7 (Brimly); Aweme, Man.; Port Credit, Ont.,

August 22; Toronto, Ont.; Montreal, Que., July 14; Levis Co., Que. August 12; Matane Co., Que., August (Winn); Terrebonne Co., Que (Hausen); Sherbrook, Que. (Begin); Montreal Isle, July (Chagnon); Vaudreuil Co., Que., July (Stevenson); Argenteuil Co., Que. (D'urban); CANADA. Common on old and young spruce trees in June and July. Beetles have emerged from pine timbers about the end of June. (Harrington.) This species is locally common and has a wide range.

Food plants, balsam and spruce.

**Buprestis maculativentris var. rusticorum** (Kirby), 37-151.

*paganorum* (Kirby), 37-152.

*acomana* Casey, 99-100.

*morosa* Casey, 99-101.

*fusca* Casey, 99-101.

*sublivida* Casey, 99-102.

*caliginosa* Casey, 99-102.

*nigricans* Casey, 99-102.

*lyrata* Casey, 99-103.

*adducta* Casey, 99-103.

Broader and more oblong than preceding species. Upper surface black with more or less of a bronzed or greenish shine. Elytra strongly furrowed, numerous minute punctures in furrows, more scattered on interstices. Antennæ dark metallic green to bronzed. Head densely and coarsely punctate with only a small spot above the antennæ to the entire anterior part being yellowish or reddish. Pronotum sometimes impressed, more often not at all so, but with a distinct median line, coarsely and unevenly punctate, sides ranging from nearly parallel and slightly arcuate at basal half to uniformly broadly rounded, anterior angles yellowish to reddish. Ventral surface and legs dark with a bronzed or greenish shine, densely, evenly and moderately punctate. Immaculate except for a row of lateral yellowish or reddish spots on abdomen, frequently wanting except on last segment. Apex of abdomen broadly emarginate in male, truncate in female. Length 15-23 mm.

RECORDS.—Ranier, April, June; Sedalia; Dilley; Divide, Douglas County; Blue Mts., August 6 (Chamberlin); Grant County, June 22; OREGON. Ft. Wingate, August 1 (Woodgate); Beulah (Cockerell); Cloudcroft (Knaus); Las Vegas Hot Springs (Schwarz & Barber); High Rolls, May 31; Albuquerque; NEW MEXICO. TEXAS (Schaupp). Boulder, July 13; Colorado Springs (Oslar); Creede, 8844 ft., August (Hunter); Manitou, July 16 (Packard); COLORADO. Northern California (Chamberlin); Fresno County; Stanford Uni-

versity, October 10 (Trimble); Sierra Nevada Mts., summit, Lake Tahoe; CALIFORNIA. Helena, July 10 (Mann); MONTANA. NEVADA. King County, 2800 ft. August 5; Tacoma, September 14 (Ferneck); Port Townsend; Seattle; WASHINGTON. Moscow Mts., July 8; IDAHO. KANSAS. Glacier B. C. (Schaeffer); Beaverfoot Range, Rocky Mts. (Wenman); Field, B. C., August 1 (Brown); Beaver Mouth, B. C., July 14; Peachland, B. C., August 3 (Wallis); Golden, B. C., August, Latitude 54, B. C.; Cross Lake, Oxford House, Man. (Bell); Cumberland House, Saskatchewan; Vancouver Is.; CANADA. Abundant in pine woods of Oregon and Washington. (Packard.) Rather abundant in certain situations; of 79 specimens collected 63 were taken feeding on the needles of *Pinus ponderosa*; many observed copulating during August; breeds in yellow pine and Douglas fir and occurs in all northern counties of California. (Chamberlin.) *Pseudotsuga taxifolia*, *Abies grandis*.

This is a geographical variety of the preceding, from which it can be readily separated by the strong elytral furrows, broader form and blackish coloration. Although confined to the west, it has a wide range north and south, examples having been taken from British Columbia to New Mexico. This form has recently been split into a number of species but the characters by which they are separated such as impression along the pronotum and shape of thorax are variable and unreliable.

***Buprestis maculativentris* var. *subornata* (Le Conte), 59-268.**

*rubronotans* Casey, 09-97.

*adonea* Casey, 09-97.

*histrion* Casey, 09-98.

*punctiventris* Casey, 09-99.

*violescens* Casey, 09-99.

Broad, moderately convex. Dorsal surface green to dull metallic green or violaceous, slightly shining. Elytral intervals strongly and alternately convex, sparsely punctate. Head deeply and distinctly punctate, anterior portion variously marked with orange-yellow. Antennæ green to dark greenish black. Pronotum coarsely, distinctly and unevenly punctate with a smooth median line, sides nearly straight, often broadly arcuate at basal half, anterior angles orange-yellow. Ventral surface and legs metallic green to bronzed, moderately coarsely and closely punctate; immaculate except for two discoidal orange-colored spots on each abdominal segment more or less connected with the lateral ones. Last segment truncate in female. Length 17-19 mm.



RECORDS.—Weed, August; CALIFORNIA. KANSAS. UTAH. OREGON. MONTANA. Las Vegas Hot Springs (Schwarz & Barber); NEW MEXICO. Colorado Spgs. (Oslar); COLORADO. Food plants are *Pinus ponderosa* (Chamberlin) and Douglas fir (Garnett).

This variety can be readily distinguished from the preceding by the uniform green to violet hue and the arrangement of the spots on the abdomen. The species described by Casey are undoubtedly individual variations.

**Buprestis maculipennis** Gory, 40-119 (Plate I, Figs. 1 and 2).

*inconstans* Melsheimer, 46-146.

*deficiens* Casey, 09-90.

*fusiformis* Casey, 09-91.

*scripta* Casey, 09-91.

*reducta* Casey, 09-92.

*leporina* Casey, 09-92.

Elongate oval. Elytra black with a distinct brassy tinge, yellowish markings extremely variable ranging from a few scattered spots to large confluent patches covering entire elytra except humerus, suture, lateral margins and triangular spot in center running from lateral margins to suture and apex which are brassy black; striae finely and closely, intervals coarsely punctate. Antennae brassy to piceous. Head densely and coarsely punctate (♂) having anterior portion yellowish with two central spots and small dot at base of each antenna brassy black; (♀) entirely dark except for small yellowish spot between the eyes and antennae. Pronotum brassy black rarely with greenish tinge, deeply to distinctly punctate, anterior angles yellowish. Under side and legs bronzed often with a greenish tinge; entirely immaculate to irregularly spotted with yellow, deeply and distinctly punctate. Anterior margin of prosternum entirely pale to dark with pale dots; prosternal spine bronzed rarely entirely yellow distinctly and sparingly punctate. Last abdominal segment with a transverse yellowish to orange-red spot at sides near base, in rare cases entirely wanting. Males with last abdominal segment truncate, females rounded. Length 10-14.5 mm.

RECORDS.—Big Pine (Davis); FLORIDA. Vowell's Mill (June); LOUISIANA. Cape Henry; VIRGINIA. Belleport, L. I., July 23, August 30, occurs with *lineata* but not so abundant (Nicolay); Mas-sapaequa, L. I., June 29 (Shoemaker); Sandy Plain near Au Sable Forks; NEW YORK. PENNSYLVANIA. Jamesburg, July 2 (Davis); Lakehurst, July 11 (Davis); NEW JERSEY. Miller's, July 21 (Selinger); July 2, 11 (Liljebald); Mineral Springs, July 4 (L. & G.); INDIANA. White Sulphur Springs, July 18 (Robinson); WEST

VIRGINIA. Pentwater, July 24 (Liljeblad); MICHIGAN. Paris, July 18 (Frost); MAINE. MASS. N. CAROLINA. MISSOURI. On dead pine logs. (Nicolay.) This species is certainly distinct and should never have been united with *lineata*, from which it may be readily distinguished by the yellowish elytral spots, more oval form and the distinct brassy tinge. Occurs with *lineata* but rarer. Owing to the wide variation in this species Casey has seen fit to describe five new forms. Two (*deficiens* and *inconstans*) he has returned to *maculipennis* (Mem., V, 1914, p. 355). As the remaining four (*fusiformis*, *scripta*, *reducta*, *leporina*) do not represent either good geographical varieties or species with constant and distinguishable characters, they should be placed as synonyms of *maculipennis*.

**Buprestis lineata** (Fab.), 75-217.

More elongate than preceding. Elytra black not so distinctly brassy, each with two more or less connected brick red to fulvous vittæ, which although sometimes entirely wanting are never broken up into distinct spots (Plate I, Fig. 4); striæ finely and intervals coarsely punctate at sides becoming finer approaching suture. Antennæ coppery to bronzed green. Head densely punctate, bronzed, anterior portion more or less marked with fasciæ or spots which are fulvous. Pronotum bronzed except anterior angles which are brick red to fulvous, deeply and distinctly punctate. Prosternum densely punctured, bronzed, anterior margin fulvous, prosternal spine sparingly punctate. Ventral surface and legs distinctly punctate, punctuation varying from fine to coarse. Last ventral segment marked with reddish near each anterior angle, sometimes quite large and almost united into a fascia but more commonly small and almost wanting. Males with last abdominal segment truncate, females rounded; a small tooth on each side. Length 12-17 mm.

RECORDS.—WEST INDIES. Enterprise; Ft. Capron; Tampa (Schwarz); Jacksonville, beaten from pine saplings (Dury); Lakeland, May 6; Gainesville; La Grange, Brevard County, September (Davis); FLORIDA. Opelika, August 2 (Hebard); Vernon Ph. (Davis); Vowell's Mills; LOUISIANA. Cobham; East Fall's Church, August 22, 30 (Gabrielson); VIRGINIA. White Sulphur Springs, July 19 (Robinson); W. VIRGINIA. MARYLAND. Billy's Island, Okefenokee Swamp, June (Loding); Jesup, Wayne County, September 1 (Rehn & Hebard); GEORGIA. Mobile, August; Grand Bay, May 25 (Loding); ALABAMA. TEXAS. Southern Pines, June to July, on blasted pines, occasionally on pine logs (Manee); NORTH CAROLINA. Bayshore, L. I., July 22 (Shoemaker); Yaphank, L. I., July (Davis);

Long Pond, Wading River, L. I., July 27 (Davis); Belleport, L. I., July 23, August 8, common on dead pine logs (Nicolay) Karner, July 10 (Joutel Coll.); NEW YORK. Lakehurst, July 28 (Davis); Sea Isle, April 26 (Luccareni); Malaga, August 4 (G. M. Greene); Newark (Bischoff); Da Costa, July 28 (Daecke); Brigantine Beach, in drifted wood (Hn.); Jamesburg, Aug. 4 (Joutel); Anglesea, June 14 (Brn.); NEW JERSEY. Lake Co., rare, June 29, July 25; INDIANA. Providence, under bark of white and pitch pine (Packard); RHODE ISLAND. Lehigh Gap, July 3 (G. M. Greene); Inglenook, April 18 (Kirk); PENNSYLVANIA. Dartmouth, June 13 (Easton); Framingham, dug dead out of white pine stump (Frost); Lowell, July (Blanchard); MASS. Nova Scotia (Hall); Toronto, Ont. (Crew); Terrebonne Co., Que. (Hausen); CANADA. Not common in Canada. Prefers pine in first death year. (Mance.)

Food plants, *Pinus strobus*, *rigida*. Mines wood of injured, dying and dead trees; loblolly pine (*Pinus taeda*); scrub pine (*P. virginiana*), and long leaf pine (*P. palustris*); pupates and transforms to beetle stage from April to June, flies from April to August, (Burke).

***Buprestis lineata* var. *davisi* new variety.**

Similar in form to preceding. Elytra brassy black each with either two more or less connected yellowish vittæ or having yellowish markings spread over entire surface, except for shoulders, lateral margin, suture and just behind the apex. Striæ and intervals finely punctate. Antennæ green, usually slightly bronzed. Punctuation and markings of head same as in *lineata*. Pronotum bronze to green with faint touch of bronze, anterior angles marked with yellowish to fulvous which often extends along lateral margins as far as posterior angles. Prosternum densely and deeply punctate, anterior margin yellowish to slightly fulvous; prosternal spine sparingly punctate. Ventral surface and legs variable bronze to green, distinctly, densely and deeply punctate. Last ventral segment having a small yellowish spot near each anterior angle. Males with last abdominal segment truncate, females rounded; a small tooth on each side. Length, male 15-18 mm., female 16.5-18 mm.

Described from a series of two males and three females collected by Mr. W. T. Davis at Cocoanut Grove, September 14, and Big Pine Key, Florida. Holotype (♂) and two paratypes (♀) in the collection of Mr. Davis. Allotype (♀) and one paratype (♂) in the Nicolay collection.

This form can be readily recognized by the light yellowish mark-

ings, more confluent than in *lineata*. It seems to be a distinct geographical race and as no specimens of the true *lineata* were taken in the same locality, we believe the form should receive a varietal name.

**Buprestis nuttalli** (Kirby), 37-152.

"Body black-bronzed, glossy, punctured; underneath with a few pale decumbent hairs. Head confluent punctured with several irregular connected levigated spaces; labial palpi, spots on the mandibles, labrum, lower margin of the eyes and frontal spots yellow. Prothorax bisinuate both at the apex and base, grossly punctured with several levigated spaces; lateral margin except the base and parts of the anterior yellow, elytra slightly furrowed, furrows punctured, interstices alternately convex and plane, the sutural one is convexed and forked at the base, the flat ones are most punctured but the convex ones more grossly; in the disc of the elytra are three equidistant irregular yellow spots arranged longitudinally, and nearer the base, on the second ridge a line of confluent yellow dots: the apex of the elytra is truncated; on each of the ventral segments of the abdomen the sides are marked with a triangular orange-colored spot, those on the anal segment being larger and irregular: the coxæ also and underside of the thighs are partly of the same color.

"Variety B. Without the yellow line of confluent dots at the base of the elytra and with the spots arranged longitudinally indistinct.

"C. With all the ventral orange spots large and irregular.

"D. Front with a large central spot. Base of the belly bluish.

"E. Elytra without yellow spots. Front as in D.

"F. With only one distinct yellow spot.

"Length 15-17 mm. (Latitude 65 and Rocky Mts.)"

RECORDS.—Port Yucan, Sahnon River (Blasse), ALASKA?. MONTANA. Telegraph Creek; Hudson Bay; Edmonton, Alta., July 3 (Carr); Banff, Alta., June 1; Dawson, Yukon; CANADA. On pine.

The above original description is presented in order to clear up the now existing confusion in correctly identifying the true *nuttalli*, which is strictly a northern species. The elytra varies in color from black with a distinct greenish tinge to plain black. This species can be separated by the rounded pronotum and the spots at the side of each abdominal segment. The yellowish markings of the head are variable and cannot be relied upon; the lateral margins of the thorax also vary from entirely yellow to black with just the anterior tips yellowish. Tip of abdomen is truncate in the female without prominent teeth.

**Buprestis nuttalli** var. **alternans** Le Conte, 59-207.*conicicauda* Casey, 09-93.*diruptans* Casey, 09-94.*contorta* Casey, 09-94.*gravidula* Casey, 09-95.*torva* Casey, 09-95.*boulderensis* Casey, 09-96.

Similar in form but usually larger and broader than preceding, without metallic luster, abdomen coarsely punctate. Similar in markings and general appearance to *consularis*, in fact specimens from Washington could easily be mistaken for the eastern form. Can be separated from preceding by the more strongly convex alternate interstices of the elytral striæ, its large size and coarser punctures of the abdomen. Length 16.5-20 mm.

RECORDS.—WASHINGTON. Gallinas Cañon (Snow); Water Cañon (Snow); Ft. Wingate, June; Grant County (Howard); Las Vegas Hot Springs (Schwarz & Barber); NEW MEXICO. Willow Creek, Cusack Ranch; COLORADO. ARIZONA. CALIFORNIA.

This is a western and southwestern variety. There is a need of additional material especially from the southwest, which we believe will prove our contention that there is a single species with an extremely wide geographical range and individual variation. In a series of specimens from one locality in the collection of Mr. Chas. Schaeffer, there is considerable difference in the shape of the pronotum, which varies from broadly arcuate to sinuate with posterior half inflated. This makes it extremely difficult to separate from the other forms, as certain specimens have the characters of *nuttalli* while others agree with the description of *alternans*. From this it would appear that there is but a single species.

**Buprestis nuttalli** var. **consularis** Gory, 40-120.*flavopicta* Casey, 09-96.

Elongate oval, black without metallic luster. Elytra with three or four orange yellow fasciæ, one at base, another just before and behind the center and one before apex, often broken up and interrupted by black elytral striæ. Alternate interstices convex. Beneath bronzed, more or less marked with orange red, moderately and distinctly punctate. Legs bronzed. Last abdominal segment truncate in both sexes. Length 13.5-17 mm.

RECORDS.—Marquette; MICHIGAN. NEW HAMPSHIRE. Monmouth, July 17, on stump of dead *Abies balsamea* (Frost); Paris, July 18 (Frost); MAINE. Lowell, July, August (Blanchard); MASS. Keene Valley, Essex County (Notman); NEW YORK. Lahaway,

July 5 (Smith); Lakehurst, July 22 (Davis); NEW JERSEY. Great Falls, July 4, adults found on pine slash (Knull); VIRGINIA. Duluth (Doggett) MINNESOTA. Cincinnati; OHIO. State College, July 19 (Knull); Harrisburg, July 31 (Knull); PENNSYLVANIA. White Sulphur Springs, July 8, August 11, on pine (Robinson); W. VIRGINIA. Ottawa; White Fish Point, Lake Superior; Sudbury, Ont.; Gory, Ont.; Levis Co. (Fyles); Vaudreuil Co. (Ouellette); Montreal Island, July (Beaulieu); CANADA.

On pitch pine. (Blanchard.) Breeds in decayed *Pinus rigida* and *virginiana*. (Knull.) This is the eastern form separated by the convex alternate interstices of the elytral striæ and the pronotum usually being sinuate and with a distinct swelling at the base.

**Buprestis læviventris** (Le Conte), 57-43.

*pugetana* Casey, 09-94.

This is a western species which can be readily separated by the smooth surface of the elytra, the variable yellowish markings usually uninterrupted by the black striæ and the feeble punctuation of the abdomen. This species quite often has a distinct greenish luster. Length 14-20 mm.

RECORDS.—Mt. Shasta, July; Northern California (Chamberlin); Truckee, 5800 ft., August (Wickham); Weed, August (Chamberlin); McCloud, July 2 (Van Dyke); CALIFORNIA. Tacoma; WASHINGTON. OREGON. ARIZONA.

Numerous in northern California, prefers old dry logs and poles without bark; eggs deposited in or on logs where there is no bark; many taken on railroad ties and in dust along road. (Chamberlin.) On *Pinus ponderosa*. Yellow, lodgepole, digger and sugar pines (Garnett).

**Buprestis confluenta** Say, 23-159.

*confluens* Le Conte, 59-206.

*tessellata* Casey, 09-104.

Elongate, slightly more oval than preceding species. Above bright emerald green to bluish, elytra thickly and confluent spotted with yellow, striæ closely and intervals sparingly punctate. Antennæ green. Head and pronotum green, coarsely and thickly punctured. Prosternum green, densely and coarsely punctured at sides, less so toward center. Ventral surface greenish with coppery luster, abdominal segments sparsely and finely punctate. Legs green. Males with broad yellow vitta extending from the anterior margin of the prosternum to near the apex of the first abdominal segment; females without pale markings. Length 14.7-16 mm.

RECORDS.—Wallace County, 3000 ft. (Snow); KANSAS. Clear Creek, July (Oslar); Littleton, June 24, July 7 (Frost); COLORADO. Miller, July 16 (Liljeblad); INDIANA. Peoria, ILLINOIS. Buffalo Gap (Hall); DAKOTA. UTAH. Badger (Colt); NEBRASKA. Lusk, July (Williams); WYOMING. TEXAS. NEVADA. Great Basin (Chamberlin); Lake Tahoe (Van Dyke); CALIFORNIA. Oweme, Man. (Criddle); Makinak, Man.; Montreal Island, Que.; Rouville Co., Que., July 10; Leduc, Alta., August 3; Wabamun, Alta., July 2 (Carr); CANADA.

*B. confluenta* mines the wood of injured, dying and dead aspen (*Populus tremuloides*) and cottonwood (*P. deltoides*); flies from July to September; attacks planted cottonwood. (Burke.)

*B. tessellata* described from Texas by Casey has no good character even to warrant the erection of a subspecies and such forms should be placed with *confluenta*. Specimens of *confluenta* from Alberta, Canada, and other northern localities appear to be more elongate and parallel and less spotted than specimens from Nebraska, Texas and the south.

**Buprestis rufipes** (Oliv.), 90-16.

*virens* Casey, 99-105.

*elongata* Casey, 99-105.

Elongate parallel, above metallic green, more rarely with a bluish violet luster. Elytra having a basal stripe, two spots behind middle and tips yellow and bidentate, striae narrow densely, intervals sparingly punctate. Antennae pale brown. Head and pronotum green or bluish, coarsely punctured. Hypomera yellow; prosternum metallic green except anterior margin and broad median vitta brownish yellow. Beneath green, last three ventral segments reddish brown with more or less of a purplish tinge, the last one generally marked with a large spot of yellow; a median stripe usually broken into spots and a row of dots along the sides yellow. Legs brown, rarely in part black to metallic green. Males distinguished by having last abdominal segment truncate, females sinuate. Length 17.5-25 mm.; extreme, 12 mm. in male and 28 mm. in female.

RECORDS.—Crescent City; Enterprise, not rare in oak trees (Schwarz); Steinhatchee River; FLORIDA. Comal County; Brownsville, July; New Braunfels, May 5 (Mittendorf); TEXAS. Newport News (Bailey); Cobham; Nelson County, July 9 (Davis); VIRGINIA. Near Little Paint Brook, Prince Georges County (Davis); MARYLAND. Southern Pines, June 30 (Manee); NORTH CAROLINA. Cov-

ington, Vowell's Mills, August; LOUISIANA. KENTUCKY. Seashore (Liebeck); Anglesea, July, on oak and flying around dead wood; Cape May (Smith's List); NEW JERSEY. Ardmore, August 14 (Mrs. Skinner); Frankford, July 1, August 14 (Schmidt); Angora, August 18, on dead beech (G. M. Greene); Overbrook, July 28 (G. M. Greene); Lancaster County (Beer); Harrisburg, July 13, adults taken on dead hickory (Champlain); Hummelstown, July 5, 15, on dead tulip poplar and beech (Knull); Phila Neck, July 9, 30, on maple and beech (Hornig); PENNSYLVANIA. Southern half of state, scarce, July 4; INDIANA. GEORGIA. Douglas County, 900 ft. (Snow); KANSAS. Cincinnati (Dury); OHIO. MISSOURI.

Breeds in oak and beech. (Chittenden.) In dead beech and maple (Dury), and the southern yellow pines. Mines chestnut, hickory, tulip (Burke).

In his Memoirs, V, 1914, p. 355, Casey states that *virgens* is the female of *rufipes*. The form described as *elongata* by Casey on its possession of blackish legs should be referred to *rufipes*, as in the examination of extended series the color of the legs was found to exhibit considerable variation. The markings of this species are remarkably constant, the greatest degree of variation being in the size.

***Buprestis viridisuturalis* n. sp.**

Elongate parallel. Predominating color of elytra fulvous or reddish. Male with suture narrowly greenish, large spot just behind middle extending from suture almost to lateral margin green, occasionally with a very small greenish dot in center of elytra midway between suture and margin. Female with suture broadly green, usually with large spot in middle and another just behind the middle extending from suture almost to lateral margin green, often with one or more small greenish dots just behind humerus. Antennæ metallic, first segment from two to three times as long as the second. Eyes large and prominent. Head and pronotum bright metallic green, densely and coarsely punctate. Sides of pronotum (male) nearly parallel, slightly arcuate, (female) more arcuate and inflated basally. Elytra parallel, slightly sinuate behind base, tips bidentate. Beneath metallic green often with purplish reflection. Prosternum not sulcated, sparingly punctate in center, more densely so toward sides. First abdominal segment not sulcated, tips bisinuate to truncate with a small tooth on each side. Legs, sides of prosternum and abdomen covered with long silvery pubescence. Legs finely and moderately punctate, metallic except tarsi which are brownish. Male, length 11-13 mm., width 4 mm. Female, length 22 mm., width 7 mm.



Holotype (♂) in the Nicolay collection and one paratype (♂) in the Weiss collection. Allotype (♀) and one paratype (♀) in the Leng collection. Two paratypes (♀ ♂) in the Schaeffer collection. Tulare Co., So. California. Dilley (Miss F. Dennis) Oregon.

This species has long been placed in collections under the name *gibbsi*. How it was originally identified as this insect is a puzzle as there is not the slightest resemblance between it and Le Conte's description and figure (Report of Pacific Exploration, 1857, Plate I, fig. 17). It is distinct from all other members of the group and could never be mistaken for anything else. On oak (Van Dyke).

***Buprestis gibbsi* (Le Conte), 57-42.**

Elongate parallel. Elytra purplish with anterior pale spot extending obliquely to the base and enveloping the humeral callus, another transverse spot just behind the middle not attaining the suture but extending to the margin and a subapical spot extending nearly to the suture and dilated along the margin; the last two spots always touched laterally with orange. Striæ deep, punctate, the intervals sparsely punctate. Antennæ testaceous, the first joint ænescent. Head purplish, punctate, the front carinate, base bisinuate. Pronotum more or less evidently impressed along the middle, sides parallel to slightly arcuate. Length 15 mm.

RECORDS.—Tulare County; Garberville, August (Chamberlin); Sonoma County (Rivers); Nevada City; Lake Ellann (Van Dyke); San Diego County (Coquillett); Palm Springs (Hubbard & Schwarz); Yosemite Valley, June 14, elev. 4000 to 5000 ft. (Mason); Sequoia Station, Tulare Co. (Hopping); CALIFORNIA. Corvallis (Chamberlin); OREGON. Manitou, July 6 (Neubarth); COLORADO. Steilacoom (Gibbs); WASHINGTON.

Not common, found occasionally on oak and poplar and probably breeds in these trees (Chamberlin). On black oak and black cottonwood (Burke). The above description was copied from Casey's translation of Le Conte with slight alterations and additions. *Gibbsi* is practically unknown in eastern collections. However Mr. Frank Mason of Philadelphia is fortunate in possessing two females. This species can be readily distinguished by the purplish elytra and the yellowish posterior spots being touched with orange, a character that is not clearly brought out in Le Conte's description.

**Buprestis connexa** Horn, 75-148.

Elongate oval. Elytra brilliant green shading to blue along suture, lateral margins cupreous, elytral intervals moderately convex more so near suture, sparingly punctate. Antennæ dark blackish cupreous, first two segments purplish. Head and pronotum cupreous with more or less of a greenish luster, head densely and coarsely punctate, pronotum more distinctly punctate, not impressed at middle but with distinct median line, sides feebly arcuate, narrower in front. Ventral surface and legs brilliant cupreous with greenish reflections, densely but finely punctate. Length 15 mm.

RECORDS.—Blue Mts., August 6, on yellow pine (Chamberlin); OREGON. Northern California (Chamberlin); California (Horn Coll.); Donner Lake (Garnett); CALIFORNIA. NEVADA (Horn Coll.). IDAHO.

Never found in numbers; a specimen was found July 28 on the foliage of yellow pine and one embedded in pitch on end of a yellow pine log; another was taken on July 18 from the sapwood of yellow pine (*P. ponderosa*) fully mature and would have emerged in a few days; the gallery traversed the cambium for some distance, winding around in a very irregular way, then entered the sapwood to a depth of two inches; the pupal cell was just within the sapwood. (Chamberlin.) On jeffrey pine (*P. jeffreyi*) (Burke).

This is one of the rarest species of the genus, less than a dozen examples being known; all of these, including the type and series in the Horn collection, are remarkably constant in size and color. Mr. W. J. Chamberlin has been fortunate in collecting some half dozen specimens.

**Buprestis fasciata** (Fab.), 87-177.

*sexmaculata* Herbst, 01-163.

*lherminieri* Chevrolat, 38-68.

*sexplagiata* ♂ (Le Conte), 59-205.

*fulgens* Casey, 09-106.

*fortunata* Casey, 09-107.

*saturata* Casey, 09-114.

Above bright green to blue. Elytra (female) with yellow fascia behind the middle and a yellow spot between apex and fascia, also occasionally with a yellow discal spot before the fascia. Male with large oblong or oval discal yellowish spot just before the fascia and not quite attaining the base. Male is smaller, usually with a more cupreous shine and the elytra are uniformly darker green than in the female. Tips either bidentate or with only a sutural tooth, external angle being rounded. Striæ moderately strong, evenly and

closely punctate, intervals broad. Antennæ dark greenish black or bronzed. Head and pronotum closely and coarsely punctate, sides of pronotum sometimes almost parallel, often arcuate and slightly swollen at base. Ventral surface and legs bright cupreous to greenish or violaceous, densely punctate. Length 11 to 18 mm.

RECORDS.—WEST INDIES. Southern Pines, in lowlands, July to late August, very rare (Manee); Cranberry (Thomas); NORTH CAROLINA. Clayton, 2000–3700 ft.; GEORGIA. Cobham; VIRGINIA. KENTUCKY. Gloucester County, rare; NEW JERSEY. Cataaugus County, July (Davis); Lake Minnewaska, July (Davis); Wilmington, July 6 (Shoemaker); Keene Valley, Essex County, July, August, September (Notman); Binghamton, Sept. (Ellsworth); NEW YORK. Endeavor, July 12 to 30 (Kirk) (Knull); State College, August 11 (Knull); Monroe County (Davis); Pocono Lake, July 10 (C. T. Greene); Crooked Creek, July 7; PENNSYLVANIA. MARYLAND. Waterford; Monmouth (Frost); MAINE. Whitehall, July 29 (Liljeblad); N. Muskegon, July 13 (Hill); Pentwater, July 18 (Liljeblad); Pequaming, August 8 (Hebard); Baraga County, August 21, July 27 (Hebard); Paw Paw Lake, July 18 (Liljeblad); Charity Island, July 18 (Andrews); Muskegon, July; Grand Beach, June; Marquette, June 28, common in washup (Sherman); MICHIGAN. Brule River, Douglas County, August 16 (Stone); Keshena, July (A. Skinner); WISCONSIN. Duluth (Doggett); MINNESOTA. INDIANA. Cincinnati (Dury); OHIO. Toronto, Ont.; Shawbridge; Matane County, August (Winn); Charlevoix County, August (Lyman); Levis County (Fyles); Terrebonne County (Hausen); Montreal Is., July (Chagnon); Vaudreuil County (Desnochers); Quebec; Parry Sound, July; Kearney, Ont., July 26 (Van Duzee); CANADA. Breeds in maple ? and poplar ? (Chamberlin).

This is an eastern species, local and not usually taken in numbers except along the shore of Lake Superior during the end of June. Dr. E. C. Van Dyke finds that *sexplagiata* is merely the male of *fasciata*. The males are rare in collections because they are taken only accidentally on shrubbery and bushes and sometimes in copula. The females can be taken on logs when they are ovipositing.

**Buprestis fasciata** var. **langi** (Mannerheim), 43-237.

*ornata* Walker, 66-324.

*bistrinotata* Casey, 99-108.

*angusta* Casey, 99-108.

*callida* Casey, 09-109.  
*fastidiosa* Casey, 09-109.  
*mediocris* Casey, 09-109.  
*crenata* ♂ Casey, 09-110.  
*seditiosa* Casey, 09-110.  
*leviceps* Casey, 09-110.  
*depressa* Casey, 09-111.  
*viridimicans* Casey, 09-111.  
*incolumis* Casey, 09-112.  
*oregona* Casey, 09-112.  
*obliqua* Casey, 09-113.  
*patruelis* Casey, 09-113.  
*graminea* Casey, 09-114.

Elongate parallel. Above bright green to golden or bluish, occasionally purplish. Elytra in female ranging in color from entirely immaculate to variously spotted with yellow. Male marked with three large pale spots. Elytral tips bidentate, or with only a sutural tooth, external angle being rounded. Striæ deeper, more densely punctate, intervals narrower, more convex and more sparingly punctate than in *fasciata*. Antennæ dark green or bronzed. Head and pronotum densely and coarsely punctate, sides of pronotum variable, arcuate to sinuate or parallel, usually impressed medially. Ventral surface and legs more finely punctate, greenish always with a more or less cupreous luster. Tip of abdomen variable, either broadly rounded or sinuate each side with angle slightly prominent or truncate. Length 15-19 mm.

RECORDS.—Quincy, June 10 (Radcliffe); Weed, August (Chamberlin); Tulare County; St. Helena, Napa County, June, July (Fuchs); McCloud, July 2 (Van Dyke); Santa Clara County; CALIFORNIA. Seattle, June 10 (Ferneck); Tacoma, July 1 (Ferneck); Port Townsend (Seaton); WASHINGTON. Cascade, June 31; Dilley; Corvallis, April 20 (Chamberlin); OREGON. Senator, in mts., July; ARIZONA. Manitou, June 28 (Skinner); Sierra Nevada; COLORADO. Atalanta; IDAHO. Gallinas Canon (Snow); Beulah (Cockerell) (Beyer); NEW MEXICO. MONTANA. So. DAKOTA. NEVADA. Wandamere, Salt Lake City, May 18 (Sasko); UTAH. Alberta (Schaeffer); Beaver Mouth, B. C., July 14; Golden, B. C., August; Victoria, B. C., July 17; Kamloops, B. C.; Manitoba; Sitkha, Stikino River, B. C.? (Hamilton); Vancouver Island; Telegraph Creek, B. C.; Hudson Bay; Beaverfoot Range, Rocky Mts.; Winnipeg (Bell); Beren's River, Man., August, Peachland, B. C., July; CANADA.

Dug from Douglas fir (Van Dyke). Probably breeds in yellow pine; often seen on bright green foliage of poplar and willow (Cham-

berlin). Although strictly a western variety, this has in common with others, a wide range from north to south. The pigment of the elytra is extremely variable and this together with the difference in size and sinuations of the elytra and thorax has unfortunately been the cause of the numerous new names recently erected by Casey. The same peculiarities in sexes exist here as in *fasciata*. The males of *fasciata* and *laugi* are sometimes indistinguishable, but in the females, the difference in elytral sculpture and shine will readily separate the two.

## LIST OF SPECIES.

**Buprestis** Linne, 60-408.

*Ancylocheira* Eschscholtz, 29-8.

*Anoplis* Kirby, 37-151.

- |   |   |
|---|---|
| B. <i>aurulenta</i> Linne, 67-661.        | <i>cribripennis</i> Casey, 09-127.      |
| <i>lauta</i> (Le Conte), 54-17.           | B. <i>decora</i> (Fabricius), 75-217.   |
| <i>radians</i> (Le Conte), 54-17.         | B. <i>salisburyensis</i> (Herbst), 01-  |
| <i>villosa</i> (Le Conte), 73-331.        | 174.                                    |
| <i>amula</i> Casey, 09-121.               | <i>ultramarina</i> Say, 36-160.         |
| <i>tacoma</i> Casey, 09-121.              | B. <i>maculativentris</i> Say, 24-272.  |
| <i>nupta</i> Casey, 09-121.               | <i>serenotata</i> Castelnau & Gory,     |
| <i>venusta</i> Casey, 09-122.             | 37-129.                                 |
| <i>prospera</i> Casey, 09-122.            | <i>maculiventris</i> G.&H., 69-1378.    |
| <i>affinis</i> Casey, 09-123.             | <i>lecontei</i> Saunders, 71-40.        |
| <i>adulans</i> Casey, 09-123.             | v. <i>rusticorum</i> (Kirby), 37-151.   |
| B. <i>adjecta</i> (Le Conte), 54-17.      | <i>paganorum</i> (Kirby), 37-152.       |
| <i>brevis</i> Casey, 09-117.              | <i>acomana</i> Casey, 09-100.           |
| <i>intricata</i> Casey, 09-118.           | <i>morosa</i> Casey, 09-101.            |
| B. <i>sulcicollis</i> (Le Conte), 59-208. | <i>fusca</i> Casey, 09-101.             |
| <i>lateralis</i> Casey, 09-119.           | <i>sublivida</i> Casey, 09-102.         |
| B. <i>striata</i> Fabricius, 75-267.      | <i>caliginosa</i> Casey, 09-102.        |
| <i>obscura</i> Casey, 09-125.             | <i>nigricans</i> Casey, 09-102.         |
| v. <i>impedita</i> Say, 36-160.           | <i>lyrata</i> Casey, 09-103.            |
| <i>canadensis</i> Casey, 09-124.          | <i>adducta</i> Casey, 09-103.           |
| B. <i>apricans</i> Herbst, 01-125.        | v. <i>subornata</i> (Le Conte), 59-208. |
| <i>nigricornis</i> (Sturm), 26-105.       | <i>rubronotans</i> Casey, 09-97.        |
| <i>bosci</i> Castelnau & Gory, 37-        | <i>adonea</i> Casey, 09-97.             |
| 146.                                      | <i>histrio</i> Casey, 09-98.            |

- punctiventris* Casey, 09-99.  
*violescens* Casey, 09-99.  
 B. *maculipennis* Gory, 40-119.  
*inconstans* Melsheimer, 46-146.  
*deficiens* Casey, 09-90.  
*fusiformis* Casey, 09-91.  
*scripta* Casey, 09-91.  
*reducta* Casey, 09-92.  
*leporina* Casey, 09-92.  
 B. *lineata* Fabricius, 75-217.  
 v. *davisi* nov. var.  
 B. *nuttalli* (Kirby), 37-152.  
 v. *alternans* (Le Conte), 59-207.  
*conicicauda* Casey, 09-93.  
*disruptans* Casey, 09-94.  
*contorta* Casey, 09-94.  
*gravidula* Casey, 09-95.  
*torva* Casey, 09-95.  
*boulderensis* Casey, 09-96.  
 v. *consularis* Gory, 40-120.  
*flavopicta* Casey, 09-96.  
 B. *leviventris* (Le Conte), 57-43.  
*pugctana* Casey, 09-94.  
 B. *confluenta* Say, 23-159.  
*confluens* (Le Conte), 59-206.  
*tessellata* Casey, 09-104.  
 B. *rufipes* (Olivier), 90-16.  
*virens* ♀ Casey, 09-105.  
*elongata* Casey, 09-105.  
 B. *viridisuturalis* nov. sp.  
 B. *gibbsi* (Le Conte), 57-42.  
 B. *connexa* Horn, 75-148.  
 B. *fasciata* (Fab.), 87-177.  
*sexmaculata* Herbst, 01-163.  
*lherminieri* Chevrolat, 38-68.  
*scxplagiata* ♂ (Le Conte), 59-205.  
*fulgens* Casey, 09-106.  
*fortunata* Casey, 09-107.  
*saturata* Casey, 09-114.  
 v. *langi* (Mannerheim), 43-237.  
*ornata* Walker, 66-324.  
*bistrinotata* Casey, 09-108.  
*angusta* Casey, 09-108.  
*callida* Casey, 09-109.  
*fastidiosa* Casey, 09-109.  
*mediocris* Casey, 09-109.  
*crenata* ♂ Casey, 09-110.  
*seditiosa* Casey, 09-110.  
*leviceps* Casey, 09-110.  
*depressa* Casey, 09-111.  
*viridimicans* Casey, 09-111.  
*incolumis* Casey, 09-112.  
*oregona* Casey, 09-112.  
*obliqua* Casey, 09-113.  
*patruelis* Casey, 09-113.  
*graminea* Casey, 09-114.

#### LIST OF THE NORTH AMERICAN FOSSIL SPECIES OF BUPRESTIS.<sup>4</sup>

- B. *florissantensis* Wickham ... Florissant, Colo. (Bull. Mus. Comp. Zoöl., vol. LVIII, No. II, 1914).  
 B. *saxigena* Scudder ..... Nicola River, B. C. (Rept. Progr. Geol. Survey Can., 1877-8).  
 B. *sepulta* Scudder ..... Nicola River, B. C. (Rept. Progr. Geol. Survey Can., 1877-8).

<sup>4</sup> Kindly furnished by Prof. H. F. Wickham.

- B. scudderi Wickham ..... Florissant, Colo. (Bull. Mus. Comp. Zoöl., vol. LVIII, No. II, 1914).  
 B. tertiaria Scudder ..... Nicola River, B. C. (Rept. Progr. Geol. Survey Can., 1877-8).

# ADDITIONAL NOTES.

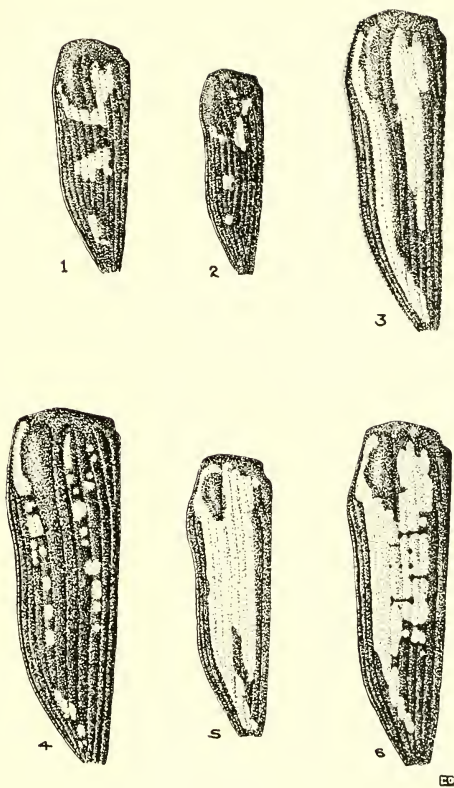
*Viridula* Oliv., 90-27, is a Philippine species placed in the genus *Hoplotrinchus* by Kerremans.

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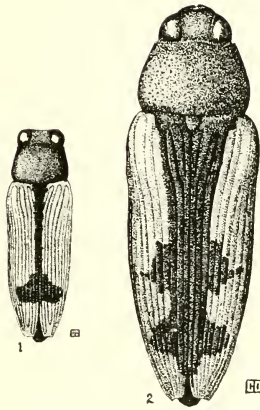
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*Buprestis.*





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For locality records and other help we take pleasure in expressing our thanks to Prof. H. F. Wickham, Mr. W. S. Fisher, Mr. Chas. Dury, Mr. W. T. Davis, Mr. J. N. Knull, Mr. H. Hornig, Mr. Geo. M. Greene, Mr. E. Liljeblad, Mr. A. B. Wolcott, Mr. E. Shoemaker, Mr. Howard Notman, Mr. W. J. Chamberlin, Prof. W. Lochhead, Mr. G. Chagnon, Mr. J. B. Wallis, Mr. F. S. Carr, Prof. E. M. Walker and Mr. Gilbert Arrow of the British Museum.

#### PLATE I.

- Figs. 1 and 2. *B. maculipennis*.  
 Figs. 3 and 4. *B. lineata*.  
 Figs. 5 and 6. *B. lineata* var. *davisi*.

#### PLATE II.

- Fig. 1. *B. viridisuturalis* n. sp. male.  
 Fig. 2. *B. viridisuturalis* n. sp. female.

## MISCELLANEOUS NOTES.

**Cicindelidæ of Chile.**—Señor Eduardo Varas Arangua, an officer of the Chilean Navy, whose address is casilla 1142, Valparaiso, Chile, has sent me the following notes on Chilean Cicindelidæ. Five species only are found in this country (a statement confirmed by Dr. Walther Horn's work in *Genera Insectorum*) as follows:

**Cicindela trifasciata**, subsp. **peruviana** Cast.

**Cicindela chilensis** Br. Found from Coquimbo to Valdivia, in the mountainous region, extending to the coast only at Concepcion al Sur.

**Cicindela gormazi** Reed. Southern Chile.

**Tetracha carolina**, subsp. **chilensis** Cast. Northern Chile.

**Tetracha carolina**, subsp. **latreillei** Cast. Northern Chile.

**Pycnochila fallaciosa** (Chev.). Southern Chile.

All except *C. chilensis* are of very restricted distribution.—C. W. LENG.

**A Note on Cremastochilus.**—Whatever may be the basis of the association which subsists between beetles of this genus and ants, the fact that such association is desired not only by the ants, which have often been observed dragging their unresisting "captives" to their nests, but is actively sought by the beetles themselves, seemed to me clearly indicated by an occurrence which fell under my observation this spring.

On May 5, 1918, a warm sunny day on which nuptial flights were generally prevalent, I stood on the summit of a ridge near Greenwood Lake, N. J., watching the struggles of several *Euphoria inda* which were beset by hordes of *Formica exsectoides*, on whose high heaped home these blundering beetles floundered. Presently a *Cremastochilus* appeared flying rapidly, and upon reaching the vicinity of the ants' nest began circling about it in ever-diminishing circles, and continually lower, until when about ten inches from the surface it closed its wings and dropped on to the heap. It was immediately seized by three or four ants, and without offering any resistance suffered itself to be dragged about more or less aimlessly, but on the whole upward and away from the margin of the nest. In a minute

another one appeared, and then another, each repeating above the ant hill the circling flight performed by the one first noted, finally dropping on to its sloping sides and undergoing a like capture. In a few minutes I had deprived the ants of this hill of seven specimens, and there were several other hills in the immediate neighborhood which were receiving their quota and supplying the cyanide bottles of my companions, Messrs. Wm. T. Davis and Ernest Shoemaker. The conclusion seems irresistible that the beetles in this instance deliberately sought the nest of the ants, with the purpose, presumably, of enjoying the association for which the genus is famed.

The species taken thus were *C. variolosus*, Kirby, *C. canaliculatus* Kirby, and *C. castaneæ* Knoch, the latter predominating in numbers. —LEWIS B. WOODRUFF.

**The Moth *Anacampsis innocuella* at Cold Spring, Long Island, N. Y.**—On June 21, 1917, twenty-nine curled leaves, each one containing a larva or pupa, were found under a single tree of *Populus grandidentata* at Cold Spring, Long Island. The larva when ready to pupate had apparently severed the leaf from the tree by cutting the petiole quite close to the blade, thus causing the leaf and itself to fall to the ground. The petiole was usually cut obliquely and about three millimeters from the blade.

Mr. Frank E. Watson has kindly compared the moths which emerged from these curled leaves in early July with allied species in the collection of the American Museum of Natural History and with the description, and identifies the insect as *Anacampsis innocuella* Zeller, of the family Gelechiidæ. The species is reported in Dyar's List of Lepidoptera, 1902, from Colorado and Texas, and in the Proceedings of the U. S. Nat. Museum, Vol. XXV, p. 406, the same author states: "The larvæ occurred as leaf rollers on the broad-leaved cottonwood (*Populus fremontii wislizeni*) at Denver. The leaf is neatly rolled to several turns, forming a remote spiral, held with cross bands of silk throughout. The end is open, and the larva can be seen in the center. Sometimes several leaves are involved."

In the Proceedings of the U. S. Nat. Museum, Vol. XXV, pp. 767-938, 1903, Mr. August Busck gives a revision of the American moths of the family Gelechiidæ, and says of *A. innocuella* that it closely resembles the European *A. populælla*, and continues: "In the National

Museum is a series, identical with the types, bred from leaves of cottonwood received from Wyoming; also a large series bred from cottonwood in Colorado by Dr. Dyar. The larva rolls the leaves in the same fashion as does the European *populella*. Zeller's types are from Texas."

In the New Jersey List, 1910, W. D. Kearfott reports the insect from Essex County, larvæ in "curled leaves of poplar, not rare."

None of these authors report the curled leaves lying on the ground under the tree, as at Cold Spring, which may have been an unusual occurrence and due to the effect of some particularly vigorous summer breeze.—WM. T. DAVIS.

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### BOOK NOTICE.

*A Year of Costa Rican Natural History.* By AMELIA SMITH CALVERT and PHILIP POWELL CALVERT. Octavo, pp. 577, with numerous half tone illustrations and map. The Macmillan Co., New York, 1917. Price \$3.00.

This is a book of details and is carefully written. There is rarely an animal or a plant mentioned that is not accompanied by at least a short description of its more striking features. The accounts of plants are particularly numerous, and many of the illustrations are of interesting trees and flowers. A systematic list of plants and animals mentioned, occupies twelve pages near the end of the volume, and the list of Odonata is no doubt most complete, as that order received considerable attention among insects. There is a list of literature relating to the natural history of Costa Rica; also a list of the papers based in whole or in part on the collections made by the authors during their journey. The features of the country are described with much care, and the different localities compared. This is also very useful, for there have been but few naturalists or observers who have given sufficient details to satisfy future generations. Every country changes gradually, the forests often disappear, even some of the insects become extinct, and we can well imagine the lasting interest that will be taken in the natural history of Costa Rica as it was in the days of the Calverts.—W. T. D.



## PROCEEDINGS OF THE NEW YORK ENTOMOLOGICAL SOCIETY.

MEETING OF NOVEMBER 26.

A regular meeting of the New York Entomological Society was held November 26, 1917, at 8:15 P. M., in the American Museum of Natural History; President Harry G. Barber in the chair with nineteen members and four visitors, including Mr. Fred Muir, Entomologist of the Sugar Planters' Association of Hawaii, present.

The Secretary read notices of the death of Mr. Wm. D. Kearfott and Charles Palm which will be printed in the JOURNAL, and was instructed to send letters of regret to their respective families.

Mr. Davis presented photographs for the Album of several entomologists in the field.

The President called upon Mr. Muir to speak of his experiences in distant parts of the world. Mr. Muir said that in view of the length of the regular program he would speak briefly of the Hawaiian Islands, which he considered isolated oceanic islands to which during a tremendously long time the flotsam and jetsam of ocean drift had brought a few forms of vegetable and animal life from which have since been evolved the numerous species that in a few tribes only now characterize its flora and fauna. It is noteworthy that in this evolution no degree of adaptation is exhibited, species have gone on forming regardless of adaptation.

The peculiar simplicity of the biological conditions with known factors make these islands the finest center for the study of evolution, which is also encouraged by the existence of the Bishop Museum. From an economic point of view, it may be said that introduced insects, from the absence of their parasites, are liable to play an important rôle. As an example, a leaf hopper damaged the sugar crop \$5,000,000 in a year; but the introduction of an egg parasite from Fiji reduced this to \$15,000. The absence of secondary parasites has caused such introductions of parasites to be attended with unusual success. Other instances have been the introduction of a Tachinid fly from New Guinea to combat a Rhynchophorous beetle, whereby a gain of 15 per cent. has been effected; and of *Scolia manila* to combat *Anomalala orientalis*, whose grubs do much damage to the roots of sugar cane. 300 Scolias were introduced and have now increased to millions, having no parasites to reduce their spread.

Mr. Muir also referred to some of the insects conspicuous by their absence, there are for instance no indigenous Lamellicorn beetles, no Photophagous beetles, no Cicindelidæ, just as in plants there is a total absence of coniferous trees; and said that he considered such absence an evidence of the islands having always been an isolated area without connection with any continent. Nothing has got there by walking or flying and everything that has reached Hawaii could have done so by ocean drift.

Mr. Davis exhibited the list of New York State Lepidoptera by Dr. Forbes and spoke on "Some Interesting Cicadas." His remarks were illustrated by distribution maps and eight large boxes of specimens, containing 16 species of Cicadas from Texas, New Mexico and Arizona, collected in the summer of 1917 by Mr. Harry H. Knight and Dr. Joseph Bequaert of the Cornell Biological Expedition. An account of these insects was published in the December, 1917, number of the JOURNAL. He also exhibited four species of Cicadas collected in the early part of 1917 by Mr. E. B. Williamson, of Bluffton, Indiana, along the Magdalena River in Colombia, S. A., and two species collected at Suretka, Costa Rica, by Mr. Alanson Skinner and Mrs. Skinner, in April, 1917. In the collection made by Williamson *Proarna insignis* Dist. were represented by 127 females and but 2 males. Many of these came to light. Mr. Skinner had a like experience at light, collecting 54 females and but one male of *Proarna championi*. A box of miscellaneous insects collected in Costa Rica by Mr. Skinner was also shown.

Mr. Sherman, under the title "Entomological Literature" exhibited many rare old books among which were the

F. V. Melsheimer Catalogue of 1806,  
Say's American Entomology of 1817 and 1824,  
Say's Descriptions of New Species of 1829,  
Catalogue of Animals and Plants of Mass. of 1835,  
Provancher's Coleoptera of Canada,  
Lepidoptera Cubana of Gundlach, 1881.

All of these were copies of unusual interest from their excellent condition and accompanying autographs and letters of Say, Gravenhorst, Harris, Edwards and others. Peal's original portrait of Say was also included.

Mr. Sherman gave an interesting account of the causes that make such books valuable, primarily their intrinsic merit, leading to a demand for them, then their date, the destruction of copies by fire or constant use, the original small edition published, sometimes their status as part of a series, giving examples of each class. He referred to the presidential address by Mr. Schwarz (Proc. Ent. Soc. Wash., II, 1891) as an excellent presentation of the facts respecting the earliest American literature, and spoke of the expedients, such as photographing pages needed, reprints, as of Kirby's and Say's works, for supplying demand for some of special importance, and said the value of certain books, of which few copies were available though their merit made their acquisition imperative, like Packard's 5th Report and LeConte's Classification, was rapidly advancing.

Mr. Dow mentioned a list of insects in the History of New Hampshire which from its early date deserved a place in Mr. Sherman's list.

Mr. Woodruff after speaking of Mr. Williamson's illness in Pittsburgh gave "Notes on Some Local Dragon Flies" illustrated by specimens. He called attention to the uncertainty with respect to the identity of the nymph of *Lanthus albistylus* Hagen, and the fact that in Muttkowski's Catalogue notation is made that the nymph is unknown. After presenting such evidence as was available, he offered as his conclusion that Hagen had himself described

this nymph in 1885, under what he supposed to be *Tachopteryx thoreyi*. He also exhibited to the Society exuvia of an undoubted nymph of the species in question, which he had taken and reared the past summer at Litchfield, Conn.

In the course of general comments with respect to the distribution of various species of the Agrionidae, he particularly referred to *Enallagma piscinarium* Williamson, which has a very local distribution, of which a considerable colony thrives at Lakehurst, N. J. He also called attention to the comparatively brief period of the life of the imago of this species and of *Enallagma recurvatum*, also found at Lakehurst, N. J., as recorded by Mr. Davis in his original description, the period of flight of each at that locality being substantially confined to the last three weeks of June.

Mr. Davis said there were now 122 species in the Local List.

Mr. Leng exhibited *Gonotropis gibbosus* Lec., collected on dead hemlock at Peterborough, Ont., in July, by Mr. Frank R. Morris.

Mr. Burns exhibited *Mutilla occidentalis* collected at Fort Wadsworth, Staten Island, August 11, 1917, and commented upon its being apparently confined to that part of the island.

Mr. Davis exhibited a cartoon by Burrill illustrating the farmer's difficulties in combating insect pests.

#### MEETING OF DECEMBER 4.

A regular meeting of the New York Entomological Society was held December 4, 1917, at 8:15 P. M., in the American Museum of Natural History, President Harry G. Barber in the chair, with 23 members and three visitors present.

Letters from Miss Rosa C. Palm, thanking the Society for its action respecting the death of Charles Palm and enclosing his photograph, and from the associates of the late Wm. D. Kearfott were received.

Mr. Davis read an obituary notice of Chas. E. Sleight that he had prepared for the JOURNAL.

Mr. Davis exhibited Bull. 391, C. U. Agl. Exp. Sta., containing "Revision of Genus *Lygus*" by Harry H. Knight and submitted for publication in the JOURNAL a "Key to subfamilies of Miridae" by the same author.

Mr. Mutchler exhibited two boxes of Lycidae and described "Some Peculiar Structures in West Indian Lycidae," consisting of processes projecting from the abdomen of two undescribed species of *Thonalmus*, found in the island of Montserrat by the late H. G. Hubbard. They occur only in the female and only in the Montserrat species, issuing from the sides of the third segment as pubescent peduncles and terminating in enlarged punctulate lobes. The form of the lobe differs in the species. The margin of the second segment in these species is emarginate laterally opposite the processes. Mr. Mutchler also pointed out that throughout the genus *Thonalmus* a correspondence between the characters of the species and their distribution can be traced, those of the Greater Antilles being red and blue, the remainder orange and blue in color, the described species of Jamaica having acuminate

scutellum, the remainder subquadrate scutellum, those of Hispaniola only forming crests apically from the elytral costæ, those of other islands more feebly developed in that respect. Some African Lycidæ with subhumeral spines were also shown. The peculiar abdominal structures were also exhibited in enlarged drawings made by Mr. Olsen and were discussed by Dr. Bequaert and Mr. Schaeffer, both of whom disclaimed any knowledge of homologous structures, and by Dr. Lutz, who said that search of the literature had so far failed to disclose anything similar. Dr. Bequaert said they might possibly be scent organs and Mr. Davis called attention to certain auricular appendages in male dragonflies as being distantly similar.

Mr. Schaeffer exhibited all the known species of *Amblycheila* of the United States reviewing the previous disputes respecting certain forms and giving as his opinion the following list of species, varieties and synonyms:

**A. cylindriciformis** Say.

ssp. *piccolomini* Reiche.

**A. baroni** Rivers.

*enodis* Casey.

var. *longipes* Casey.

**A. schwarzi** W. Horn.

Mr. Schaeffer also recorded the following additions to the known distribution of Cicindelidæ, viz.: *Cicindela striga*, St. Petersburg, Fla., collected at light by Mr. J. Doll. *Cicindela decemnotata*, Alaska, received from Mr. B. Preston Clark, and spoke of specimens of *Cicindela arizona* taken at the type locality by Mr. Englehardt and of *Cicindela parowana* found by Mr. Engelhardt at a new locality in Utah.

His remarks were discussed by Mr. Harris and by Dr. Bequaert. On reference to Merriam's faunal map it appeared that *Amblycheila cylindriciformis* was confined to Sonoran regions, while the other species occurred in the higher Transition regions or near their junction with the Sonoran. Dr. Bequaert mentioned finding one specimen at light in July and another after rain, but could not corroborate their abundance.

Mr. Barber read a paper on "Some Hemiptera from the Adirondack Mts. collected by Mr. Notman," exhibiting a collection of 56 species of Heteroptera from Keene Valley, Essex Co., N. Y. He mentioned the thoughtful generosity of Mr. Notman in giving his time and attention to further the knowledge of the distribution of insects of the State other than the Coleoptera, in which he was especially interested. Comparison of the number of species was made with the number of species listed in Smith's New Jersey List (409) and in Parshley's List of New England (419). Reference was also made to the various lists of Hemiptera of similar regions in the northern United States. Mr. Barber referred to the comment of Dr. Wm. L. Bray in the "Development of the Vegetation of New York State," 1915, on the character and origin of the flora and insect fauna of Keene Valley in the Adirondacks. Though in the main the hemiptera fauna belonged to the Canadian Transition, the

northward trend of more southern and austral species could be explained on the ground of a north and south cleft, which give rise to so-called "warm pockets." Several strictly boreal forms were mentioned and others referred to which were more southern in their occurrence.

Mr. Nicolay exhibited a part of his collection of exotic Buprestidæ comprising the brilliant Julodini of southern Europe, Asia, Africa and Malay Archipelago.

Mr. Leng called attention to an article in "Science" of November 9 by Ralph C. Benedict, establishing again *Tineola biselliella* as the common clothes moth of the vicinity, and giving results of treatment in storage warehouses; also to Charles Dury's "Synopsis of Cisidæ" in Journal Cin. Soc. Nat. Hist., XXII, No. 2.

#### MEETING OF DECEMBER 18.

A regular meeting of the New York Entomological Society was held on December 18, 1917, at 8:00 P. M., in the American Museum of Natural History, President Harry G. Barber in the chair, with twenty members and four visitors, including Lieut. W. J. Chamberlin, present.

Mr. C. William Beebe, N. Y. Zoological Park, was elected an active member.

The date of both January meetings was, on motion, seconded and carried, postponed for one week each.

The President appointed as a Nominating Committee, Messrs. Dickerson, Watson and Sherman.

Mr. C. H. Richardson read a paper "Comments on the Choice of Food by Insects" in which the observed facts were summarized and analyzed. During the discussion that followed Mr. Richardson said that in Nevada he had watched large Cicadas start from the top of a sagebrush and an Asilid fly, evidently prompted by the movement, start out and catch them; but Mr. Davis objected that in his wide experience in Cicada hunting he had never had similar experience, the Cicada Killer in the East being guided neither by sound or movement.

Dr. Bequaert, with the aid of blackboard tables and several boxes of specimens, offered "Some Remarks on the Distribution of Wasps" which will be printed in full in the Museum Bulletin.

Mr. Shoemaker read a paper on "Collecting in Big Indian Valley" illustrated by several boxes of the insects he caught, among which were so many of northern distribution that Mr. Sherman said they looked like the wash-up on the shores of Lake Superior; Mr. Shoemaker said in part that from Big Indian Station on the D. & H. R. R. a road follows the valley to and beyond Slide Mt., 4,200 ft. high, with some of the highest and wildest mountains of the Catskill region rising on either side. He spent ten days in 1915 and the week between July 1 and July 7, 1917, at Johnson's farmhouse on this road, collecting principally on the flowering shrubs by the roadside. The first trip

this year, on July 1, will long be remembered, for only a few minutes after opening the umbrella a couple of sharp whacks at a flowering tree brought no less than four *Anthophilax*, one of which was nearly black, into the umbrella besides a number of other beetles, elaters, longhorns, etc. Mr. Shoemaker continued "I will not try to describe my feelings and anxiety to grab them all at once, for all of you have doubtless had the same experience—suffice it to say that not one of the four escaped me; that trip decided my method of collecting for the entire week and, with the exception of two dozen jars that I planted for *Cychnus* (which yielded about 20 *canadensis* and one *viduus*), the daytime was spent beating into the umbrella, the nights in sugaring and light collecting."

Mr. Dickerson corroborated the excellence of the region which offered the best opportunity for collecting northern species near New York, and Mr. Davis humorously objected that few, if any of us, had experienced the excitement of seeing four live *Anthophilax* at once.

Mr. Davis exhibited two lots of Cicadas. From Dulzuras, San Diego Co., California, Professor Wm. S. Wright had sent his many specimens of *Okanagana vanduzeei*, with varieties *consobrina* and *californica*, all collected in June, 1917. *O. californica* has often been considered a distinct species, but is probably but a variety of *vanduzeei*, as first suggested by Mr. Van Duzee. Twenty specimens of *Tibicinoides cuprosparsa* and three *Clidophleps distanti* were also collected in June at Dulzura by Professor Wright.

The second lot of Cicadas were received from Mr. Morgan Hebard and consisted of nine species, among them the beautiful *Ugada nutti* from Africa. Of American species *Tibicen resonans* was represented by 22 individuals, collected at Indian Rock Beach, Pinellas Co., Florida, September 17, 1917, by Mr. Hebard and Mr. Rehn, who found the insects in great numbers in a grove of small oaks. The males were in full song and the noise produced was considerable. Owing to their fresh condition the specimens were very beautiful and the pruinose spots on pronotum and tergum were present and conspicuous.

Mr. Dow read a paper criticizing the methods of publication employed by the owners of the "Lepidopterist" which will be published elsewhere.

Lieut. Chamberlain, upon invitation by the President, spoke of collecting *Buprestis connexa* in the Blue Mountains of eastern Oregon and northern California, always in the vicinity of yellow pine, once by actually cutting it out of the wood. *Buprestis lauta* appeared to have several host plants but cedar was surely one.

In reply to a question by Mr. Dow, Lieut. Chamberlin said that his personal experience in collecting *Trachykele* was limited to three specimens, but from Mr. Hopping's information and other sources, he believed Incense Cedar and Redwood were its food plants.

Mr. Sherman said he learned by letter from Col. Casey that no further "Memoirs on the Coleoptera" would be published until the fall of 1918.

## MEETING OF JANUARY 8.

The annual meeting of the New York Entomological Society was held at 8.00 P. M., January 8, 1918, in the American Museum of Natural History. President Harry G. Barber in the chair, with fifteen members and four visitors present.

The Nominating Committee reported the following nominations for officers for 1918: *President*, Lewis B. Woodruff; *Vice-President*, Edward D. Harris; *Treasurer*, William T. Davis; *Secretary*, Charles W. Leng; *Librarian*, Frank E. Watson; *Curator*, Andrew J. Mutchler; *Executive Committee*, R. P. Dow, G. P. Engelhardt, H. B. Weiss, E. Shoemaker, H. Notman; *Publication Committee*, C. Schaeffer, F. E. Lutz, W. P. Comstock, John D. Sherman, Jr.; *Delegates to New York Academy*, Wm. T. Davis. There being no further nominations, the Secretary was instructed to cast an affirmative ballot for the persons above named who were thereby elected.

Mr. Notman exhibited nine boxes of Adirondack Carabidæ including 169 species, all, with one exception, personally collected, mounted and identified, and called attention to the following as being apparently peculiar to high altitudes and elevations:

*Sphæroderus brevoorti* Lec. Maine, Canada, Lake Superior.

*Loricera carulescens* Linn. No. Eur., No. Asia.

*Nebria sahlbergi* Fisch. Alaska, Br. Col., Labrad., N. H.

*Nomius pygmaeus* Dej.

*Bembidium nitidum* Kby. Can. to Pacific Coast.

*Bembidium scopulinum* Kby. Labrador, Canada, N. H., N. Eng., N. Y., Mich., Man., Colo.

*Bembidium oblongulum* Mann. Canada, Maine, N. H., Vt., Mass., Ohio, Mich., Alaska.

*Patrobis septentrionis* Dej. No. Eur. and Amer., Labr.

*Pterostichus punctatissimus* Rand. Maine, L. Sup., Nfld., Mass., Canada.

*Pterostichus (Cryobius) hudsonicus* Lec. H. B. T., N. H., L. Sup. (Alaska?).

*Pterostichus (Cryobius) fatuus* Mann. Alaska.

*Pterostichus (Cryobius) mandibularis* Kby. Canada, Lat. 54.

*Amara arenaria* Lec. Canada, Maine, N. H., Mass., L. Sup.

*Amara longula* Zimm. Br. Col. to So. Cal.

*Amara pallipes* Kby. Can., L. Sup., Mt. Wash., Mass., N. J., Ia., Wis.

*Amara polita* Lec. L. Sup., Colo., Pa.

*Calathus advena* Lec. Canada, Alaska.

*Platynus deceptivus* Lec. Nova Scotia, L. Sup.

*Platynus 4-punctatus* Deg. Alaska.

*Miscodera arctica* Payk. Scotland, Lapland, Newfoundland, Maine, Alaska.

*Harpalus spadiceus* Dej.

*Harpalus* sp. near *laticeps* Lec.

*Stenolophus scitulus* Csy. Philadelphia.

*Tachycellus nigrinus* Dej. Alaska.

*Tachycellus tibialis* Kby. Canada.

mentioning for each its distribution, as given above, outside the Adirondack Mts. In reference to certain species Mr. Notman also added some interesting information, *Cryobius mandibularis* being for instance found between 3,000 feet and the tree line, while *Cryobius hudsonicus* and *fatuus* were found only above the tree line, where in fact most of the boreal species listed occurred. An exception, however, was *Miscodera arctica* of which two specimens were found on the cement steps of the Club House in Keene Valley, about 1,000 ft. elevation. These steps were surrounded by grass and as *Tachycellus nigrinus* was invariably found flying over lawns and never under stones, the two may have similar habits. Mr. Notman also mentioned that in identifying his Adirondack Carabidæ by original descriptions, he was forced to dissent with some published synonymy. *Tachycellus tibialis* Kby. was certainly not synonymous with *nigrinus*, nor *Stenolophus scitulus* Casey with *conjunctus* Say. The *Miscodera* of the Adirondacks looked also very different to the European specimens and the name *insignis* applied by Mannerheim to Alaska specimens should probably be reinstated; or possibly the name *hardyi* given by Chaudoir to Newfoundland species.

In the discussion that followed Messrs. Barber, Sherman and Leng referred to similar species occurring in Maine, Labrador and Newfoundland, adding some of the distribution data included above.

Mr. Weiss read a paper on "*Gryllotalpa gryllotalpa*, the European Mole Cricket," which will be printed elsewhere. It was illustrated by specimens of all stages from egg to adult and photographs and was discussed, especially in comparison with native mole crickets, by Messrs. Davis, Barber, Engelhardt and Richardson.

Mr. Dow, after reading an entomological poem by Sir Joseph Banks, read his own paper, entitled "How Long Does an Insect Live?" in which the great difference between the adult life of mayflies, beetles like *Meloe*, etc., was contrasted with the prolonged adult and larval existence of certain wood-boring species.

In the discussion that followed, other instances of long larval existence were recalled, Lieut. Chamberlin in particular giving one of *Buprestis lauta* emerging after sixteen years from the door-jamb of a house in Oregon.

Mr. Dow also exhibited correspondence with S. E. Cassino regarding the "Lepidopterist."

Mr. Sherman gave some facts regarding the sale of Dr. Leconte's books and letters from the widow of Thomas Say. Mr. Davis recorded that she had lived on Staten Island in 1880.

Mr. Engelhardt exhibited *Cicindela parowana* Wickh. taken at Iron Spring, Iron Co., southwest Utah, 5,500 ft. elevation, July 20, 1917, on sandy soil covered by sparse grass, near a small reservoir, the water of which was heavily impregnated, and said that this locality was 25 miles southwest from Lake Parowan, the type locality, and that doubtless it occurred in suitable places throughout the Parowan Valley and possibly even to Shirt's Lake; but that none were found on bare sandy ground.



Mr. Davis, after pointing out that the boxes exhibited were probably part of those used by Dr. George H. Horn, and therefore parent of the Schmidt boxes, exhibited 26 Cicadas collected in July, August and September, 1917, by Mr. M. R. Harrington, at Hot Springs, Arkansas, and pointed out how clearly it was shown by the species represented, that nearly the same natural conditions appertained as in southern New Jersey and surrounding country. The species represented were the following: *Tibicen pruinosus* Say, 17 specimens; *Tibicen linnei* S. & G., two; *Tibicen sayi* S. & G., one; *Tibicen lyricen* DeGeer, four; *Tibicen davisi* S. & G., one; *Tibicen auletes* Germ., one.

#### MEETING OF FEBRUARY 5.

A regular meeting of the New York Entomological Society was held February 5, 1918, at 8:00 P. M., in the American Museum of Natural History, President Lewis B. Woodruff in the chair, with twelve members present.

Mr. E. L. Bell, 438 Amity St., Flushing, N. Y., was proposed for active membership by Mr. Watson.

The President appointed Messrs. Bequaert and Nicolay on Field Committee and Messrs. Wiegmann and Notman on Auditing Committee.

Mr. Leng exhibited *Microclytus gazellula* and *M. gibbula*, two longhorn beetles of similar appearance, and read a correction of previously announced synonymy; together with a paper by Frank R. Morris, of Peterboro, Ont., explaining how the error had occurred and had been detected.

Mr. Nicolay exhibited a complete collection of the species of the genus *Buprestis*, reviewing its history, larval characters and taxonomy. It was noteworthy that Burke, from study of the larvæ, had proposed to divide the genus into three sections, which course had also been suggested by Casey, from study of adult characters.

Dr. Avinoff on invitation exhibited a box of rare Rhopalocera, *Anthocaris orientalis*, from Banff, Alberta, indistinguishable from the Siberian species, *Argynnus* from Alaska, *Papilio machaon*, Alaska variety and many species of *Parnassius*, remarking that the occurrence of Palearctic forms in the northern parts of America was of much interest.

Mr. Weiss exhibited *Idiocerus scurra* Germ, a leaf hopper, of which he gave briefly the life history.

Mr. Davis exhibited "Fieldbook of Insects" just published by Dr. Lutz.

Mr. Leng exhibited "Color and Color-Pattern Mechanism of Tiger Beetles" by Victor E. Shelford.

Mr. Dow mentioned that C. W. Howard, Canton Christian College, Canton, China, was prepared to supply Chinese insects to those interested.

Mr. Davis exhibited four species of *Cicada*, *hieroglyphica*, *pruinosa*, *lyricen* and *auletes*, collected by A. E. Brower near Willard, Missouri, and read extracts from Mr. Brower's letters in reference to their being taken by yellow-billed cuckoo, as follows:

"I found three or four species to be common this season, but found myself unable to compete with the yellow-billed cuckoo in securing them."—From letter of A. E. Brower, Willard, Mo., December 9, 1917.

Referring to a *Tibicen auletes* with part of its thorax eaten, Mr. Brower writes under date of January 30, 1918, "Yes, I rescued the specimen of *Tibicen auletes* from a cuckoo and I have seen them chase many specimens and eat some. I spent the month of August and early September in the hills and both the Cicadas and the yellow-billed cuckoo were common. The cuckoo is usually shy, but when after a Cicada it is not so, as I have often thrown rocks at them to chase them away. I have seen them listen to the Cicada singing for a moment, and then fly to the tree and begin an immediate search for the insect, and the Cicadas certainly dread the presence of the Cuckoo.

#### MEETING OF FEBRUARY 19.

A regular meeting of the New York Entomological Society was held February 19, 1918, at 8:00 P. M., in the American Museum of Natural History, President Lewis B. Woodruff in the chair, with seventeen members and five visitors present, including Dr. Avinoff of Russia.

Mr. E. L. Bell, 438 Amity St., Flushing, N. Y., was elected an active member of the Society.

Mr. Olsen read a paper on "Collecting at Woods Hole, Mass.," illustrated by photographs of the locality and several boxes of specimens. After describing the physical characteristics of the boulder-stream coast and adjoining marsh and woodland, and the equipment of the Marine Biological Laboratory, Mr. Olsen spoke of the Hemiptera captured, of which a list is appended to the original minutes.

Dr. Avinoff, after exhibiting 100 original colored plates by John Abbott, spoke of the "Boundary of the Palearctic Region as illustrated by the Distribution of Rhopalocera" saying in part that precision in zoogeography was best attained by studying the distribution of species, being careful, however, to note the territory in which the species was abundant as opposed to that in which it was occasional. By combining such studies for many species, certain regions and subregions might be delimited, each surrounded by an additional area in which its influence was appreciable. Dr. Avinoff exhibited a number of maps on which the distribution of individual species of Rhopalocera had been indicated and a map of the Palearctic Region with its boundaries ascertained from the combined distribution data. On this map a Transition area, in which the Palearctic influence was appreciable but not dominant, was excluded; and in a general way it was found to coincide better with the early ideas of Wallace than with the recent map of Dr. Pagenstecher. Dr. Avinoff regarded the Chinese subregion as a part of the Indo-Malayan, and the Arabian as a modification of the African, rather than of the Palearctic, though in both the Palearctic influence could be traced.

The area of dispersion outside a province often results in its influence being superimposed upon the indigenous fauna, so that in Turkestan, for instance, two such areas of dispersion can be traced in one place.

Touching the American Fauna Dr. Avinoff said the Palearctic influence

in its northern parts was evidently very great, so that the study of Siberian species became essential, especially that part of Siberia extending from Lake Baikal and the Altai Mts. eastward to the Pacific, of which the fauna was closely allied to ours.

His remarks were discussed by Dr. Lutz and Dr. Bequaert, the latter saying that the new method of fixing limits was very interesting and in northern Africa its results were corroborated by those of botanists, based upon the distribution of *Acacia*. However, he thought it difficult to agree about Arabia and the Sahara, the latter having possibly been at one time less arid than at present.

Mr. Leng mentioned the work of Poppius on the genus *Cryobius* as supplying evidence of the strong relation between Siberian and Hudsonian beetles.

Mr. Dow spoke of the great interest attached to John Abbot's plates and their superiority to the reproductions, also of the price he was paid for his work by John Francillon, viz.: 6¼ cents for each figure.

Dr. Lutz spoke of Westwood's original drawings presented by Mr. Hyde to the Museum.

Mr. Watson read a paper on "A Large Number of Species of Butterflies observed in One Day's Collecting," which will be printed elsewhere.

Mr. Notman exhibited and distributed specimens of *Protheca puberula*, a Ptinid beetle, of which he had bred more than 100 from rotten wood at Keene Valley, N. Y.

#### MEETING OF MARCH 5.

A regular meeting of the New York Entomological Society was held at 8:00 P. M., March 5, 1918, in the American Museum of Natural History, President Lewis B. Woodruff in the chair, with 22 members and two visitors, Messrs. F. G. Carnochan and J. Tee Van, present.

The Secretary read a letter from War Savings Society Bureau and exhibited enclosures accompanying same.

Mr. Engelhardt spoke of "Collecting in the Plateau Region of Southwestern Utah," illustrating his remarks by a large number of photographs and specimens of the Lepidoptera mounted by his companion, Mr. Jacob Doll. Mr. Engelhardt said in part that their headquarters from about April 19 to July 22 were at Gregerson's Ranch, Bellevue, Iron Co., Utah, from whence many excursions were made into the surrounding mountains, which in beauty of rugged sculpture and coloring, were among the most remarkable natural features of the continent. Bellevue is midway between Parowan and St. George, Utah, where H. F. Wickham collected, but the great differences of elevation in southwest Utah, ranging from 3,000 ft. in the Virgin River Valley to 10,000/12,000 ft. on the plateaus, cause great faunal differences, and his efforts were largely devoted to the more elevated sections, hitherto unexplored by entomologists. A full account of the expedition, with a map, is given in the January number of the *Brooklyn Museum Quarterly*. The in-

sects have been only partly worked up but, besides the discovery of an extended range for *Cicindela parowana*, already noted in the minutes, Mr. Engelhardt mentioned the capture of *Amblycheila schwarzi*, of four *Sphinx dolli* on evening primrose and of *Lycena* and *Carabus* at 8,000 ft. elevation in the Pine Valley Mts. on June 1, though there had been 15 inches of snow the night before. The aspens showed many workings of *Saperda* in these mountains, but it was too early to obtain specimens. On the Kolob Plateau the larvæ of *Hemileuca* (?) were found on Indian Currant, and are being reared by Mr. Doll, also a small *Sphinx* on dandelion. At St. George, where the mild climate permits the cultivation of sugar cane, figs, etc., the yucca was abundant and Mr. Engelhardt secured larvæ, pupæ and adults, the latter very rapid at midday, of the skipper that breeds on it, *Egiale yuccæ* var. *coloradensis*, and exhibited specimens, including the food plant and galleries made by the larva.

Near the little town of Hurricane, he visited a cave which served as a natural trap and on the countless mummied remains of the animals caught, found the Tenebrionid beetle *Cryptoglossa verrucosa* common. Much attention was paid to Cicadas on account of Mr. Davis's interest in them; one was remarkable for the similarity of its song to the noise of the rattlesnake.

Mr. Davis stated that five species of Cicadæ had been collected by Mr. Engelhardt and that it was the song of *Okanagana schaefferi* that resembled the whirl of a rattlesnake, and in this instance occasionally deceived the listener. Mr. Englehardt collected 17 males and two females of this species in the foothills of the Kolob Mts., in Washington Co., Utah, June 24, 1917.

In reply to a question by Mr. Schaeffer, Mr. Englehardt said the two specimens of *Amblycheila schwarzi* were found drowned in a pool in the nearly dry bed of an arroyo and were perhaps washed down the cañon, so that little could be safely said of the environment.

Mr. Engelhardt's experience with coyotes, mormons and rough travel were very interesting, and illustrated, as well as the insects shown, the possibilities of a little known region.

Mr. Nicolay as Chairman of Field Committee, presented the following schedule of outings: March 31, Palisades; April 7, Staten Island; April 14, Central Park, L. I.; April 21, South River; April 28, Great Notch; May 5, Greenwood Lake; May 12, Jamesburg; May 19, Ft. Montgomery; May 26, Central Park, L. I.

Mr. Notman exhibited the following Adirondack dragon flies:

*Lestes unguiculatus* Hagen.... (Keene Valley.)

*Lestes disjunctus* Selys..... (Keene Valley.)

*Lestes uncatus* Kirby..... (Mt. Marcy, 4,500 ft. Keene Valley.)

*Argia putrida* Hagen..... (Keene Valley.)

*Chromagrion conditum* Hagen.. (Mt. Marcy, 4,500 ft.)

*Nehalennia irene* Hagen..... (Mt. Marcy, 4,500 ft.)

*Enallagma hageni* Walsh..... (Keene Valley.)

*Enallagma ebrium* Hagen..... (Mt. Marcy, 4,500 ft. Keene Valley.)

- Enallagma carunculatum* Morse. (Keene Valley.)  
*Enallagma piscinarium* Wmsn.. (Mt. Marcy, 4,500 ft. Keene Valley.)  
*Enallagma exsulans* Hagen.... (Keene Valley.)  
*Enallagma antennatum* Say.... (Keene Valley.)  
*Ischnura verticalis* Say..... (Mt. Marcy, 4,500 ft. Keene Valley.)  
*Plathemis lydia* Drury..... (Keene Valley.)  
*Lencorhinia hudsonica* Hagen.. (Mt. Marcy, 4,500 ft.)  
*Nannothemis bella* Uhler..... (Mt. Marcy, 5,000 ft.)  
*Sympetrum semicinctum* Say... (Keene Valley.)

## MEETING OF MARCH 19.

A regular meeting of the New York Entomological Society was held at 8:00 P. M., March 19, 1918, in the American Museum of Natural History, President Lewis B. Woodruff in the chair, with 14 members and four visitors present.

Mr. Leng called attention to the approaching twenty-fifth anniversary of the Society's incorporation on June 7, 1893, and suggested that a special meeting be held June 7, 1918, to celebrate it.

On motion the matter was referred to the Executive Committee.

Mr. Davis read a paper on the "Introduction of Palearctic Mantids in the North Atlantic States" illustrated by many specimens of *Tenodera sinensis* and *Mantis religiosa* and the native *Stagmomantis carolina*, with their egg masses and nymphs. This will be printed in full in the *Bull. Br. Ent. Soc.*

In the discussion that followed, Messrs. Engelhardt, Barber and Watson gave further details of their captures, recorded by Mr. Davis. Mr. Davis also described his journey from Farmingdale to Cold Spring Harbor, Long Island, in June, 1917, particularly in reference to the West Hills and Millville. The most interesting capture resulted from finding 27 curled leaves under a poplar, near Cold Spring Harbor, from which emerged a tortricid moth, *Anachampsis innocuella*. As will be printed in Miscellaneous Notes, the discovery that the leaves are deliberately cut off by the larvæ seemed new. Other notes made by Mr. Davis are as follows: Along the road in the West Hills, first a female and then a male of the beautiful geometrid moth *Nacophora quernaria* was found. The black and white color pattern, conspicuously contrasted in the female, is most intricate; and a careful comparison of the wings will show that to a certain extent the bilateral resemblance is not maintained in every particular.

A colony of grasshoppers, *Eritettix carinatus* was found on top of High Hill (410 ft.), one of the West Hills, and Long Island's highest ground.

In the Cicindela field at Cold Spring five *Cicindela generosa*, one *tranquebarica*, three *rugifrons*, and eight *modesta* were found on June 21. Since the destruction of the Aqueduct locality, this is the only known place on Long Island where *Cicindela modesta* can be found, and all the specimens from Cold Spring are spotted like those found on Staten Island, and no immaculate individuals, such as used to occur at Aqueduct, have been collected.

Dr. J. Bequaert spoke "On New and Interesting Bees, chiefly from Arizona" captured by him while a member of the Cornell Transcontinental Automobile Expedition. These were *Emphor bombiformis* Cress., found on mud road on left bank of Sabine River in Louisiana, which showed that *Emphor fuscojubartus* Ckll. found near Arlington, N. J., by Grossbeck, and Cape May, N. J., by Davis, was distinct, not a synonym.

*Dieunomia marginipennis* found on flowers of *Helianthus annuus* near Tempe, Ariz., which proves to have a pollen gathering brush beneath the abdomen as well as on the legs.

*Perdita* ? n. sp. An exceedingly small bee, 4 mm. long, found near Tempe, Ariz., on the flowers of a trailing euphorbia. It was abundant but too small to be caught in the net and the great heat made the labor of catching them by crawling up with a collecting bottle, too arduous to be long continued.

*Caupolicana yarrovi* Cress., a crepuscular bee taken about 5:00 A. M. in Texas on desert willows, where it was detected by its buzzing before it became light.

*Hemisia morsei* Ckll. and *rhodopus* Ckll. were found on *Centaurea* flowers near water tanks east of Sierra Blanco, Texas, while carrying water around the end of a freight train, but the absence of a net necessitated catching them by hand. Dr. Bequaert said that the females had very good stings.

*Xenoglossa particia* Ckll., another crepuscular species, was found on flowers of wild squash which open in the evening and close before morning. Often they could be found by day hidden in the closed flowers.

Dr. Bequaert pointed out in connection with these crepuscular bees certain characters in the ocelli and the color common to all.

*Protoxaca gloriosa* Fox was shown for its beauty and five other insects, a syrphid fly, *Sphiximorpha loewii* Williston, a *Polistes navajoe* Cress., and three *Megacanthopus flavitarsis* Sauss., for their similar coloration, which is even more apparent in life than in dried specimens.

Mr. Davis said the colony of *Emphor* he knew of at Cape May occurred in a path worn hard by constant use.

Mr. Engelhardt said the primrose and low euphorbia flowers were very attractive to crepuscular insects in southwest Utah, as he had observed while collecting specimens of *Sphinx*.

In reference to the activity of Hymenoptera at night, Mr. Davis said his experience in hunting at night with a lantern indicated more activity than might be suspected. *Camponotus americanus* was certainly more active at night than by day. He quoted also the following passage from Rev. J. G. Wood's "Insects at Home," p. 354, to show the activity on moonlight nights of *Vespa crabro*: "The successful capture of a hornet's nest is a very difficult business and that of a wasp's is child's play to it. In the first place it is much more difficult to cut a nest out of a hollow tree than to dig it out of the earth, and in the next place the hornet works all night, provided the moon shines, whereas the wasp stays at home."

Mr. Woodruff exhibited a number of depauperized *Spermophagus robinia*

hatched from honey locust beans in June. The beans had been gathered in October and kept very dry so that all the specimens were much smaller than usual.

Mr. Nicolay exhibited specimens of *Pediculus vestimenti*, parasitic lice, locally common in New York City and known there as "cooties."

Mr. Olsen exhibited a Japanese work on Cicadellidæ and an interesting collection of that family from the U. S. N. M. in which were specimens of several interesting species.





# THE NEW YORK ENTOMOLOGICAL SOCIETY.

Organized June 29, 1892.—Incorporated June 7, 1893.

The meetings of the Society are held on the first and third Tuesday of each month (except June, July, August and September) at 8 P. M., in the AMERICAN MUSEUM OF NATURAL HISTORY, 77th Street and Eighth Ave.

Annual dues for Active Members, \$3.00.

Members of the Society will please remit their annual dues, payable in January, to the treasurer.

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*Vice-President*, EDWARD D. HARRIS . . . . . Yonkers, N. Y.

*Secretary*, CHAS. W. LENG . . . . . 33 Murray St., New York.

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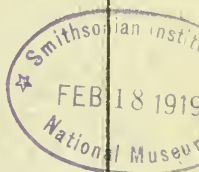
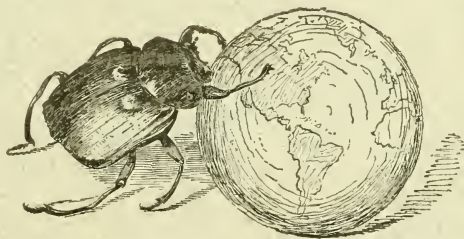
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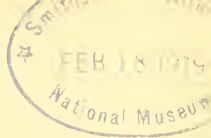
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# JOURNAL

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## New York Entomological Society.

VOL. XXVI. SEPTEMBER—DECEMBER, 1918. Nos. 3 AND 4

### HISTORY OF THE NEW YORK ENTOMOLOGICAL SOCIETY, 1893-1918<sup>1</sup>

BY CHARLES W. LENG,

STATEN ISLAND, N. Y.

The certificate of incorporation was presented to the Society on June 7, 1893; it was signed by Neumogen, Ottolengui, Palm, Beyer and Angell, and provides for a term of existence of fifty years from February 1, 1893, the date on which it was executed. The Committee on Incorporation consisted of Palm, Dietz, Groth and Dr. W. C. Prime, a relative of Mrs. Slosson's.

Preliminary to its incorporation, the embryo of the Society had

<sup>1</sup> Read at a special meeting held June 7, 1918, to commemorate the twenty-fifth anniversary of the incorporation of the Society. The meeting was held in the Hotel Colonial and was preceded by a dinner in which many visitors participated, including representatives of the New York Academy of Sciences, the Philadelphia Academy of Science and the Brooklyn Entomological Society. Letters of congratulation were read from E. A. Schwarz, the Society's only honorary member, from The Entomological Society of Washington, the Entomological Society of Canada and from many of the Society's corresponding members and former presidents. Interesting reminiscences of the Society's early days were presented by letter or in person by Mrs. Annie Trumbull Slosson, Charles Dury, Henry Bird, Dr. R. Ottolengui, Dr. Henry Skinner, A. C. Weeks. Dr. E. E. Smith, President of the New York Academy of Sciences, spoke of the importance of insects in relation to disease, and Mr. R. P. Dow, editor of the Bulletin of the Brooklyn Entomological Society, of the future of the Society, urging specialization in restricted fields of investigation. These letters and speeches are filed in the minutes of the Society.

been in existence for about two years. Several meetings had been held during 1891 by Dietz, Beyer, Tunison and Schaeffer, devoted entirely to Coleoptera, at which Mr. Schaeffer had often suggested the organization of a Society. Mr. Dietz, taking up the idea earnestly, finally succeeded in interesting several other men, and on June 29, 1892, the Society was organized with Charles Palm as temporary chairman. This meeting was held at Mr. Palm's house. Those present were Palm, Beutenmuller, Dietz, Tunison and Rabe. They elected as members Neumogen, Beyer and Mrs. Annie Trumbull Slosson. The next meeting was held after the summer vacation on September 7, 1892, when seven more members were elected, namely: Ottolengui, Angell, Havell, Meitzen, Seibelt, Bradford and Julich. Regular meetings were held thereafter, sometimes at the homes of Palm, Neumogen or Mrs. Slosson, sometimes at the German-American school, 244 East 53d St., and finally, through Mrs. Slosson's intercession with the late Morris K. Jesup, in the American Museum of Natural History. Many active and associate members were elected at these meetings prior to the incorporation of the Society of whom the following survive and are still members: Mrs. Slosson, Beyer, Ottolengui, Angell, Fillion, Groth, Schaus, Schaeffer, Kudlich and Bird. During this preliminary period the JOURNAL was started by subscription, to which Mrs. Slosson was the largest contributor, with Beutenmuller as editor; it was supported in part by the proceeds of auction sales of the insects; here again Mrs. Slosson was the donor of many of the specimens sold. It will be seen, therefore, how important her assistance was in the inception and establishment of the Society and its JOURNAL.

Following its incorporation, the Society continued a successful career for about ten years, with Mr. Beutenmuller as editor of the JOURNAL. The average attendance was about eight persons and only occasionally a meeting was informal for lack of quorum; the JOURNAL was published regularly. Scientific matter of great value was contributed to it and presented at the meetings by Dyar, Beutenmuller, Schaeffer, Zabriskie and Joutel. The late Louis H. Joutel became a member of the Society February 1, 1893; he was for many years thereafter a most valuable member, serving the Society as secretary for four years and as treasurer for five years. His artistic talent made him an efficient member of the Publication Committee and his

wide knowledge of the life history of insects a most interesting contributor to the meetings. By his long illness and death, the Society and entomology have suffered a great loss and one of our few sorrows on this occasion is that Joutel is not with us.

During these first ten years the following of our present members were elected, namely: Shoemaker, Love, Lagai, Davis, Barber, Wunder, Cammann, Weeks, Comstock and Watson, all of these before the year 1900. Subsequent to 1900, Green, Leng, Graef, Southwick, Sherman, Engelhardt and Harris. During this period also the Society became a member of the Scientific Alliance and in consequence is now one of the Societies affiliated with the New York Academy of Sciences, whereby the members receive the weekly Bulletin. The social gatherings after the meeting adjourned became also an important feature that though seldom referred to in the minutes is at least once commemorated in the entry on April 17, 1900: "A very pleasant time was spent yet after adjournment."

The annual meeting of January 6, 1903, in developing two tickets for election of officers reflected a political tinge in the Society's affairs that was novel and for a time disconcerting. Proxies were used and their use afterward disapproved. The Society lost the support of a few members but gained in the more earnest support of the remainder. The attendance increased and a remarkable good feeling between the members was the result. The Society's affairs have prospered ever since. When Professor Wheeler came to the American Museum he became a regular attendant at the meetings, always full of information on every subject that came up. Still later, Dr. Lutz became a member and immediately took a most active interest, instigating the Local Collection, the Environment Symposium and speaking frequently of the broader aspects of entomology, and since the war, Dr. Bequaert, with his intimate knowledge of the flies and wasps of three continents, has added greatly to our strength.

Without attempting to recite the dates when each member was elected, May 21, 1907, may be mentioned as a memorable one, for then R. P. Dow became a member of the Society with most pleasant consequences in the field, at Lahaway Plantation and elsewhere, and at the meetings, where we have heard him tell of the insects of Egypt and other ancient countries and of the entomologists of olden times.

The connection between the Society and the American Museum



has always been a close one and an advantageous one to the Society, for it has light, heat, meeting place, storage for its own library and the use of the Museum, all free of cost, so that all its funds are available for publication. The insect collections of the Museum and its exploring expeditions become more or less Society affairs. Whereby the history of our recent years includes some studies in the fauna of distant regions, Dr. Bequaert and James Chapin have told us something of Africa. Dr. Lutz and Dr. Crampton of South America and the West Indies; Messrs. Mutchler, Watson and Barber have also spoken of the West Indies, while Dr. Lutz again has investigated the fauna of Florida and Arizona. Mr. Davis also has become an entomological explorer in Florida and I have been able to contrast the conditions in Labrador and Cuba. Apart from Museum expeditions, our members have individually wandered far from home, and thanks to Schaeffer, Beyer, Hall, Engelhardt, Davis, Sherman, Barber, Hallinan, Notman, Osburn and Wright there are few parts of the United States unmentioned in the minutes. We also derive benefit from visitors to the Museum, as when Mr. Fred Muir drops in from Hawaii, Dr. Azinoff from Central Asia or Dr. Van Dyke from California.

We have perhaps been more interested in pure entomology than in its economic features, but the latter have been represented by Messrs. Dickerson and Weiss and the too infrequent visits of Dr. Felt. In the distribution of our discussions over the various orders of insects rather than in the concentration on Lepidoptera and Coleoptera only, we have been particularly fortunate, especially of late on account of the interest that Messrs. Barber and Olsen take in the Hemiptera, Dr. Lutz and Dr. Bequaert in the Hymenoptera and Diptera, Dr. Osburn and Mr. Woodruff in the Odonata, while Mr. Davis, though specializing in cicadas, is apparently ready to furnish specimens and information on each and every order.

You must not imagine that such results have been attained without work, much of it so unobtrusively done that it is scarcely well enough known even to members. In this connection I would call your attention to a few men who have given much attention to the Society's affairs; the late Louis H. Joutel has already been mentioned. Of those living, I think Mr. Charles Schaeffer heads the list with three years' service as secretary, ten as librarian and twenty-



two on the publication Committee, making a record of service in some capacity ever since the Society was incorporated. Mr. William T. Davis has been treasurer for fourteen years and the present balance, with the establishment last year of the Permanent Fund, tells how 'good a one. Mr. Harry G. Barber was secretary for nine years, Dr. Lutz was curator for five years, Mr. Mutchler has been curator for the last four years; the late John A. Grossbeck was librarian for three years, during which time he partly arranged the back numbers of our JOURNAL. Mr. Frank E. Watson has been librarian for the last three years and has completed the arrangement of our stock of JOURNALS. Mr. C. F. Groth was treasurer for three years. At various times Dr. Wheeler, Dr. Dyar, Dr. Love, Dr. Lutz and Mr. Comstock have served on the Publication Committee. The Society has honored the following men in succession by election to the presidency: Angell, Beutenmuller, Zabriskie, Palm, Love, Groth, Roberts, Leng, Osburn, Barber, Woodruff and would have elected Mr. Edward D. Harris long ago if he had been willing to accept the office.

To these men I think that we owe much but there are also some whose steady attendance make for our success, though modesty prevents their taking office. The records I have kept for exactly one hundred meetings show that the following have been present at forty or more: Davis 95, Mutchler 95, Dow 93, Barber 82, Lutz 79, Woodruff 71, Sherman 64, Watson 62, Schaeffer 61, Olsen 60, Dickerson 59, Shoemaker 58, Angell 55, Engelhardt 50, Wunder 47, Nicolay 41, while the steady attendance during late years of Weiss, Notman, Burns and Dr. Wiegmann promises to qualify them later for inclusion in the ranks of the steady.

Reviewing the progress of twenty-five years, the Society may congratulate itself upon an increased, active, and harmonious membership, made up of seasoned veterans and ambitious youngsters, upon its twenty-five volumes of JOURNALS filled with valuable contributions, upon its accumulations of books and money, its happy memories of past meetings and vivid hopes for future ones. It seems to be solidly established in connection with this great Museum and capable of extending its future usefulness in the language of its certificate of incorporation "in the advancement of the science of entomology in all its branches."

## REMINISCENCES OF THE EARLY DAYS OF THE NEW YORK ENTOMOLOGICAL SOCIETY.<sup>1</sup>

BY A. T. SLOSSON,

NEW YORK, N. Y.

I am very sorry and really mortified to find that I can give you so few details of the early days of our New York Society. For I am one of the small remnants left of the members who entered it at the beginning, twenty-five years ago. But I had probably already gone from the city to my summer home in Franconia before our first meeting and did not return until October. I think only a few meetings, at irregular intervals, had been held during the summer. Soon after my return from the mountains I attended a meeting at the residence of Mr. Palm. My brother-in-law's old Arab butler escorted me that evening, calling for me later to see me home. I shall never forget the sensation produced by my unexpected entrance into that scientific meeting! Through the smoke of pipes and over mugs of some beverage which foamed in the gaslight in a sudsy sort of way I saw startled, embarrassed faces. "A woman!—and finding us like this!" So their expressions seemed to say. The host himself, good Mr. Palm, seemed somewhat embarrassed. After seating me in the most comfortable chair unoccupied he hastened away to order coffee for me as more appropriate and fitting drink for a feminine throat. We were the weaker sex then, you see—for those were our voteless days—and we must be kept carefully apart from the ways and habits of men in their idle moments. I was not at all shocked at this orgie, for I had five brothers and spent much of my time in a tobacco-smoky atmosphere, seen many a foaming beverage poured and quaffed, and so we were all at our ease in a few minutes and chatting over our summer's adventures and their net profits. I recall a few of those present at that time—Dr. Ottolengui, Messrs. Angell, Siebalt and Julich. After that I attended the meetings quite regularly and came to know very pleasantly most of our members. We met at different houses, Mr. Palm's, Mr. Neumoegen's and at my brother-in-

<sup>1</sup> Read at a special meeting held June 7, 1918, to commemorate the twenty-fifth anniversary of the incorporation of the Society.

law's residence on 23d street, where I then lived. Dr. Zabriskie became a member that same year, '92. I think, a charming, genial man, with a young heart even as he waxed old. I remember well my first encounter with him at one of our meetings. I had, some months before, printed in *Harper's Magazine*, a story entitled "Aunt Randy." The heroine was an elderly White Mountain woman with a love for insects. She watched them, studied their habits and, though all unconscious of it, was a sort of natural entomologist. She had her own names for the insects who frequented her small garden and knew them individually as she would know her human neighbors. The mourning cloak butterfly, *Vanessa antiopa*, she spoke of as belonging to the Tough family, giving it the name to express its hardiness and ability to endure the winter's cold, it being one of our few hibernating butterflies. To one of this species who had slept through a Franconia winter near her home and which she knew by a torn wing she gave the Christian name of Mary Ann. So when Dr. Zabriskie and I were introduced one evening his first remark was "How is Mary Ann Tough?", with that twinkle in his eyes we who knew and loved him all remember. I had come to know Mr. Beutenmüller before this through my friendship with Harry Edwards, he having assisted him in the care of his valuable collection and other entomological work and we had talked together in the insect rooms at the Museum of Natural History of the Society's starting some sort of magazine. This was effected, a subscription list started and the first number of our JOURNAL published in March, 1893. The opening article in the first number happens to bear my name as author. It was a paper I had read at one of our meetings held at the German American School on East 52d Street. Because of certain reasons I can give you with confidence the name of one member present. As I finished reading the paper—it was entitled "Common versus proper" and discussed the use of scientific nomenclature as opposed to popular—and modestly left the stage (as a fact we had no stage, then or ever afterward, but that seems a more classical way of putting it) Dr. Roderigues Ottolengui sprang to his feet and burst into words. Such a tribute! I cannot recall details but my poor, simple little paper was extolled to the highest heavens. Not only was it far, far superior to any article read hitherto at any of the meetings of our society, but—well, Cicero, Demosthenes, Patrick Henry and other oratorical stars rated some-

what highly in the opinion of the world before this would have blushed with shame at their inferiority had they been with us that evening and heard the gallant Doctor's comparisons. I was naturally pleased—what woman does not dote on flattery, however gross?—and, you see, I did not at that time know that the doctor was a maker of fiction! “About these days,” as the Farmers’ Almanac used to say, we began holding auctions for the sale of rare and desirable insects, the proceeds to be applied to the expenses of the new JOURNAL. As I had been so fortunate as to travel each winter to the extreme southern part of our country and to spend summers in our high northern altitudes, in Franconia and on the summit of Mt. Washington I had duplicates of many rare species and gladly contributed them for the good cause. Those auction sales were most amusing things. I should like to attend one now; the “movies” are nothing compared with them. One evening, at a sale at the residence of Mr. Neumoegen, a reporter from one of the city dailies was present. He was a most puzzled and astonished man. Wandering about the room he asked one after another the meaning of the affair but evidently could not at all understand the attempted explanation given him. Now I belonged to a family of journalists and had been accustomed to reporters and interviewers from childhood. So I beckoned the poor news seeker to my side, telling him I would explain the whole thing to him as it went on. And, knowing the particular jargon of the cult I kept my word and made clear to him—that is as clear as it could be made to a non-entomological person—the meaning of what went on. Only a few weeks ago I came across that article of his, clipped from the newspaper he sent me. I laid it aside and have now looked for it in vain. It was fairly correct, owing to my lucid explanations, but typographical errors were innumerable, as was natural, and the whole article was mildly sarcastic. I find among my papers a letter from Mr. Beutenmüller giving results of one of these auctions held in '98. I see by that specimens of lepidoptera donated by me brought in \$76. *Sphinx canadensis* brought \$5.00, the purchaser having authorized bidding as high as \$12.00 if necessary to secure the desired specimen. Other prices obtained were \$2.45 for *Anchocelis digitalis*, \$1.50 for *Enhalisidota longa*, \$1.15 *Thecla martialis*, 50 cents *Plusia vaccinii*, 55 cents *Plusia mappa*, *P. viridisigma*, 60 cents. There was much

rivalry, and to an outsider like my reportorial friend the sight of mature, often elderly men, shouting bids excitedly like brokers on the stock exchange, for the purchase of mere bugs instead of bonds seemed very funny, not to say absurd. One evening, after, through the late Mr. Jessup's kindness, we were allowed to hold our meetings in the Museum of Natural History, my next neighbor at one of the meetings was a youth with whom I fell into conversation. He owned that he was not a real entomologist but liked all sorts of creatures and was devoted to natural history. In the course of our talk he finally confessed that he liked snakes better than any other creatures and told me sadly that he had his trials in the pursuit of ophidian study for, oddly enough, his mother and other female relatives objected strongly to the presence of rattlesnakes in the house! Though I could see their side of the story I expressed warm sympathy with the lad and we became very good friends. That, in spite of feminine and family opposition, he mastered the reptilian subject and became an expert in his line of research you will not doubt when I tell you that the boy's name was Raymond Ditmars, our famous snake charmer and student. He began young, you see, as do all real naturalists and was as a baby, I am sure, "Pleased with a rattler, tickled with its fang." Well, you have had enough of these wandering reminiscences, I am sure. If you have looked for something *historical* on this wonderful anniversary and found only something *hysterical* and frivolous, please make allowances. I am a woman and an aged one, and such are apt to be garrulous.

But let me just add my warm appreciation of the courtesy and kindness uniformly shown me by the masculine element, so largely in the majority, in this society. I never forget it, can never fail to remember it, and I herewith thank from my heart all you "boys," as I love to style you, who have been such friends and comrades to me these many years.

## A NEW RACE OF CICINDELA WITH NOTES ON OTHER RACES AND SPECIES.

BY CHARLES W. LENG,

STATEN ISLAND, N. Y.

In "The Cicindelinae of North America" published by Mr. E. D. Harris and me, and distributed by the American Museum of Natural History in 1916, the treatment of the American species by Dr. Walther Horn in "Genera Insectorum" was made known to our fellow students without any interpolation of our own views. That some difference of opinion should exist is, however, natural, and it is the purpose of the present paper to point out such differences as they appear to me. My notes will refer to the genus *Cicindela* only for Mr. Schaeffer has reviewed *Amblycheila* with more material in hand than any other author has assembled, and Colonel Casey has done the same for *Omus*, so that Dr. Horn's treatment of those genera has already been revised.

In *Cicindela* there are a few instances in which I can not agree with Dr. Horn's interpretation of the literature and the synonymy he consequently proposes. These are:

### *Cicindela scutellaris* var. *lecontei*.

Dr. Horn alters this to *modesta* because Dejean in 1825 (Spec. Col., I, p. 52) described the color of *modesta* as "fusco-ænea" and as "brun-obscur un peu bronzé," giving an erroneous locality, "Saint-Domingue." His words fit better a faded specimen of var. *modesta* than they do any specimen of var. *lecontei*. Dejean was more likely in 1825 to have specimens from the Atlantic coast reach him through Palisot de Beauvois than from Nebraska, Manitoba, Ontario, where var. *lecontei* occurs. Finally in 1831 Dejean (Spec. Col., V, p. 210) says that *modesta* "noted in error in the collection of Palisot de Beauvois as coming from Saint Domingo" is "probably only a variety of *rugifrons* in which the color has become 'noir obscur.'" Haldeman did not describe var. *lecontei* until 1853 and there seems to me every evidence that Dejean knew nothing about that variety. I propose, therefore, to retain Haldeman's name for var. *lecontei*.

***Cicindela obscura* Say.**

This name, cited by Dr. Horn for the race we call *modesta*, was preoccupied. Dr. Horn gives the citation "Trans. Am. Phil. Soc., 1818, p. 418, pl. 13, fig. 7," and differentiates the insect there described from the *modesta* of Dejean 1831 and subsequent authors. To me they seem synonymous as they did to Dejean and, *obscura* being preoccupied, the use of the name *modesta* is justified for the black form of *scutellaris*.

***Cicindela trifasciata* var. *tortuosa* Dej.**

Dr. Horn changes this to *ascendens* Lec., remarking that in the Banks Collection there is a specimen of *ascendens* labelled Jamaica under *trifasciata*. Dejean described *tortuosa* in 1825 from North America and the Antilles as differing from the South American *trifasciata*. Leconte's description of *ascendens* was made in 1851. I can not see any reason for preferring it to Dejean's name.

There are also a few instances in which Dr. Horn points out the double use of a name without supplying a new name for the second use. These are:

***Cicindela purpurea* var. *auduboni* Lec.**

This name was first assigned by Leconte (Journ. Bost. Soc. Nat. Hist., V, 1845, p. 207) to a green variety of *purpurea* from Yellowstone River. Later (Trans. Am. Phil. Soc., XI, 1856, p. 37) he used the same name for the black variety, in which he has been followed by subsequent authors till now. Unfortunately the first use will have priority and I propose *nigerrima* in place of *auduboni* Lec., 1856, for the black variety of *purpurea*. The *Cicindela graminea* of Schaupp will come close to being a synonym of *auduboni* as originally defined, but Dr. Horn retains both names.

***Cicindela cartagena* var. *hentzi* Geo. H. Horn.**

I propose for the Lower Californian insect the name *hentziana*, which Dr. Horn in Proc. Cal. Ac. Sci., 1894, p. 307, wrongly called *hentzi* Dej.

***Cicindela spreta* Lec.**

This name was originally applied (Ann. Lyc. Nat. Hist. N. Y., 1848, p. 177) to a dark form of *limbalis* occurring in Maine, for

which it should be retained. Later (l. c., 1856, p. 37) Dr. Leconte applied it to a black form from New York not since recognized, which may be sunk in synonymy.

There are a number of instances in which the relative rank assigned to various species does not accord with American ideas. Perhaps our being on the spot and possessed of large series from definite localities should give our judgment preference. Perhaps Dr. Horn viewing such matters from a distance and with his great knowledge of the *Cicindelæ* of the world is the better judge. I have no wish to assume to know better than he how our species and varieties should be ranked and willingly accept his judgment in many instances. There are, however, a few cases in which I feel so confident that he has erred that I would here record my opinion that

*C. duodecimguttata* and *C. repanda* are distinct species.

*C. sexguttata* and *C. patruela* are distinct species.

*C. sperata* and *C. cuprascens* are distinct species.

*C. mirabilis* is entitled to a higher rank than Dr. Horn gives it.

*C. lantzi* " " " " " " " "

*C. borealis* " " " " " " " "

*C. criddlei* " " " " " " " "

*C. carolina* " " " " " " " "

*C. levettei* " " " " " " " "

*C. Snowi* " " " " " " " "

*C. woodgatei* " " " " " " " "

*C. media* " " " " " " " "

On the other hand the *vibex* of Geo. H. Horn, 1866, can not properly be ranked as subordinate to the *sierra* I described in 1902. Priority would make *vibex* the species if the two were closely related; but I believe both are distinct species.

The following is a form of *longilabris* occurring in Newfoundland which requires a name:

***Cicindela longilabris novaterræ* new var.:**

Size and form of *C. longilabris*, but brilliant green bronze above and beneath, the labrum white, the legs dark, as usual. Markings of elytra comprise white humeral spot (sometimes very small or lacking), subhumeral spot, middle band, bent, not reaching the margin, and subapical spot. The markings are all narrow; the subapical spot is not at all enlarged as in the green forms from Colorado, nor are any of the white markings broad as in *perviridis* from the Pacific Coast.



Type (in my collection) collected by W. S. Genung near Bay St. George, Newfoundland, in July. Additional specimens in my collection were collected by Geo. P. Engelhart at the same place, also in July. Typical *C. longilabris* was found by Mr. Genung at Bay of Islands, but only the green form at Bay St. George. Mr. Engelhardt tells me that both forms may be found at Channel Village.

The Cicindelidæ of Newfoundland as far as known include the above described forms of *longilabris* and *C. tranquebarica* var. *horiconcensis*, Stephenville, *C. limbalis*, Bay of Islands, *C. duodecimguttata*, Little Codroy, Nicholville, Stephenville, *C. sexguttata* (Leconte, Trans. Am. Phil. Soc., XI, 1860). The exact locality for the last is unknown; all the others come from the west coast where Fernald (Rhodora, XIII, 1911, p. 117) found Carolinian plants on the sandy beaches and dunes. As far as we now know the localities named above mark the most northern limit of the family on our Atlantic coast.

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## MISSISSIPPI CICADAS, WITH A KEY TO THE SPECIES OF THE SOUTHEASTERN UNITED STATES.

BY WM. T. DAVIS,

NEW BRIGHTON, STATEN ISLAND, N. Y.

For several years Professor R. W. Harned has kindly sent to me for identification the cicadas collected by the students of the Mississippi Agricultural and Mechanical College. It has been a pleasure to go over the specimens, and now that records for eighteen species have accumulated, including a new one, it seems desirable to make a list of those known to occur in the state. Mississippi is rich in cicadas, and as far as the present records show, has even more species than Florida. This is easily explained, for some of the western species reach as far eastward as the valley of the Mississippi River. The discovery of the green-colored *Okanagana*, described in this paper, from the delta section of the state, has been a great surprise. It suggests that other unknown forms may still exist and emerge from time to time from their unseen feeding places beneath the sur-

face of the ground. As far as is known this is the first species of *Okanagana* found in the Gulf States east of Texas.

The key to genera and species not only covers the cicadas from Mississippi, but the southeastern United States in general. The only species of the region not occurring in Mississippi are *Tibicen canicularis* (Harris), found at least as far south as Cape May County, New Jersey, and *Tibicen biconica* (Walker) of Florida and the West Indies. These two species are figured as a further aid to their identification.

The *Tettigonia variegata* Fabricius, from "Carolina," has not been identified, owing to faulty description. It may be one of several of our well-known species. Francis Walker described *Cicada resonans*, *Cicada viridifascia*, *Fidicina figurata* and *Fidicina olympusa* without locality, but the species have been credited to North America by Distant in *Genera Insectorum*, who placed them in two instances as synonyms of *Tibicen auletes*. All four names have here been applied to species native to Mississippi and nearby states. It is hoped that this has been done correctly, but whether correctly or not it has seemed preferable to use the names until the matter can be settled, as it will be in time by the growth of more extensive collections, and perhaps by the examination of the specimens described by Walker, if they at this time can surely be identified as his material.

Of the twenty species mentioned in the present paper, sixteen belong to the genus *Tibicen* and are so listed by Mr. Van Duzee in his Catalogue of the Hemiptera. The remaining four genera contain but one species each.

Thanks are due to Dr. Wm. H. Wiegmann, of the New York Entomological Society, who has kindly subjected the keys to the test of determining specimens, and it is hoped that they will be found of service.

#### KEY TO GENERA OF CICADAS OF THE SOUTHEASTERN UNITED STATES.

Tympanal coverings concealing tympanal orifices.

Head large and broad, body walls of abdomen thickened; opercula large ..... **Tibicen** Latreille.

Head small, abdomen translucent; opercula very small. . **Cicada** Linnæus.

Tympanal coverings absent.

Cells of median area of fore wings longer than marginal cells.

Head (including eyes, which are red in life) nearly as broad as base

of mesonotum. Opercula rather large, nearly touching on inner margin ..... **Tibicina** Kolenati.

Head, including eyes, much narrower than base of mesonotum. Oper-  
cula small with extremities far apart.....**Okanagana** Distant.

Cells of median area of fore wings of about the same length or shorter than the marginal cells.

Very small species ..... *Melampsalta* Kolenati.

KEY TO SPECIES OF THE GENUS *TIBICEN* FOUND IN THE SOUTHEASTERN  
UNITED STATES.

A. Large, heavy bodied species; head broad, uncus simple, and first cross vein in the fore wings starting from radius 3 far back, or about one third distant from base of first marginal cell.

*B. Uncus* longer than broad. Black species with green or greenish markings and black area on the central part of the abdomen beneath, except in *sayi*, and new variety of *davisi*.

C. Hind margin of pronotum or collar, green or greenish.

A narrow irregular area of black on the under side of the abdomen; opercula short and broad, and usually in the males an attenuated, pruinose stripe each side on the dorsum of segment three ..... **pruinosa** (Say).

Dorsum of abdomen with the hind margin of the segments more or less brown and generally but a trace of pruinose stripe each side on segment three.

*pruinosa* var. *winnemanna* (Davis).

Dorsum of abdomen shining black with a broad pruinose mark each side on segment three; blackened area on under side of abdomen more in the nature of an even stripe.

*pruinosa* var. *latifasciata* (Davis.)

A longitudinal band of black on the under side of the abdomen, the opercula more lobate, and the margin of the front wings suddenly bent near the middle.

*linnei* (Smith & Grossbeck).

A definite longitudinal band of black on the under side of the abdomen; head with the front rather prominent. Not a large species ..... *canicularis* (Harris).

An irregular band of black on the under side of the abdomen, head rounded in front; a rather small species.

**davisi** (Smith & Grossbeck).

Abdomen greenish centrally on under side, blackened area wanting, marginal cells of fore wings clouded.

**davisi** var. **harnedi** new variety.

CC. Hind margin of pronotum or collar black or nearly so (except in *savi* var. *australis*).

*D.* Central area of the abdomen beneath black.

Opercula long and with the legs usually somewhat chestnut colored; the uncus when seen in profile forked, resembling the open mouth of a snake.

**similaris** (Smith & Grossbeck).

Opercula much shorter, more rounded, and the black area on the under side of the abdomen in the nature of an even stripe. Uncus not forked.

**lyricen** (De Geer).

Blacker than typical *lyricen*, lacking the considerable amount of fulvous markings on the pronotum and mesonotum. A fulvous somewhat anchor-shaped mark centrally on the pronotum.

**lyricen** var. **engelhardti** (Davis).

*DD.* Central area of the abdomen not black beneath, often pruinose, as well as the long opercula.

Collar black, often with a greenish spot each side near the outer angles.....**sayi** (Smith & Grossbeck).

Collar all green or nearly so, as well as the pronotum and mesonotum .....**sayi** var. **australis** (Davis).

*BB.* Uncus broad at the base, triangular in shape and generally about as broad as long. Opercula broad and rounded at the extremities; no definite black area on the central part of the abdomen beneath, usually unicolorous.

*E.* Wings long and narrow, collar 2 mm. or less in breadth at central portions; dorsum of abdomen black or nearly so.

Basal cell of fore wings rusty in color, anal cells (membranes) of both pair of wings gray; usually expands 110 mm. or more .....**resonans** (Walker).

Basal cell of fore wings often black or nearly so, anal cells of both pair of wings yellowish. Expands about 100 mm. ....**figurata** (Walker).

*EE.* Wings broad, hind margin of the pronotum or collar green or greenish and more than 2 mm. broad.

*F.* Anal cells or membranes at base of fore and hind wings gray.

Dorsal segments of the abdomen not margined with brown; in fresh specimens the basal segments pruinose, also the terminal segments, leaving the four middle segments black. A large species expanding over 110 mm. ....**auletes** (Germar).

*FF.* Anal cells or membranes at base of fore and hind wings light orange, two prominent marks on the mesonotum resembling the Hebrew letter resh inverted.

Fore wings with the first and second cross veins clouded, and the dorsum of the abdomen brownish or brownish black .....**resh** (Haldeman).

Fore wings with the first and second cross veins but

faintly or not at all clouded and the abdominal segments margined posteriorly with brown. In fresh specimens there is usually a median row of white spots on the dorsum of the abdomen. *marginalis* (Walker).

*AA.* Small species; uncus wish-bone shaped, and first cross vein in the fore wings starting from about the middle of the first marginal cell.

*G.* First and second cross veins of fore wings clouded.

Expanse of wings about 90 mm. .... *biconica* (Walker).

Expanse of wings about 60 mm. .... *olympusa* (Walker).

*GG.* First and second cross veins of fore wings not clouded, wings clear throughout and expanding about 70 mm.

Head rather large, front rounded, collar greenish or yellowish and contrasted in color rather sharply with the brown and black of pronotum and mesonotum .... *viridifascia* (Walker).

Head proportionately smaller than in the last; front more protruding; collar not so contrastingly colored and fore wings narrower .... *vitripennis* (Say).

#### *Tibicen pruinosa* (Say).

Figured in JOURNAL N. Y. ENTO. SOC., March, 1915, Pl. 2, fig. 2. This is one of the most common species in Mississippi, and forty-two specimens have been examined, twenty-two of them from Agricultural College, Oktibbeha County. The other localities are Iuka, Coldwater, Okolona, Rosebloom, Strong's, Greenville, Starkville, Jackson, Forkville and Norris. The dates of capture range from June to October. So far none have been received from the southern part of the state.

The known distribution of this species is the general region of the valley of the Mississippi as far north as eastern Nebraska, and as far east as Indiana. In the more elevated regions of Virginia, North Carolina and southwestward, the variety *winnemanna* Davis, with the posterior margins of the segments generally brownish, is to be found, while the variety *latifasciata* Davis, with a broad white, pruinose mark on the third abdominal segment, occurs along the Atlantic coast, close to the ocean. These two varieties may possibly be found in Mississippi, the first in the higher parts of the state, and the second along the coast.

The song of *pruinosa* is quite unlike that of any of the other large native cicadas, and may be rendered as *z-zape*, *z-zape*, *z-zape*. The insect often remains quiet all day, singing from about 3 or 4 P. M. until dark.

**Tibicen linnei** (Smith & Grossbeck). Pl. VII, fig. 1.

Ratliff, summer, 1915, female (A. McIntosh). There is considerable uncertainty about this specimen, for the reason that locality labels may have become mixed, but as the species occurs in Tennessee there is no reason why it should not occur in Mississippi as well.

The female of this species often closely resembles that of *T. pruinosa*, but in *linnei* the fore wings are abruptly bent near the middle, whereas in *pruinosa* the curve is more regular. The song is very different from that of *pruinosa* and is a continuous *z-ing*, but generally of short duration.

**Tibicen davisi** (Smith & Grossbeck). Pl. VII, fig. 3.

Longview, September, 1916, female (J. H. Oswalt); Vimville, August 2, 1914, female (E. R. Raney); Columbia, July, female (B. Morris); Hattiesburg, August, 1916, male (W. H. Cook); Caesar, summer, 1916, male and female (R. H. Stewart); Anner, July, 1915, male, and summer, 1916, male (H. P. Smith); Long Beach, July 10, 1916, male (W. J. Frederick).

In addition to the above there is a female which represents a variety of *davisi*. We also have two others from Arkansas. This variety may be described as follows:

**Tibicen davisi** var. **harnedi** new variety, Pl. VII, fig. 4.

Type male, Helena, Arkansas, June, 1916 (K. D. Jacob). Davis collection.

Allotype female, Rodney, Jefferson Co., Miss., August, 1917 (O. A. Hammett). Collection, Miss. Agri. and Mechanical College.

More robust than typical *davisi*, with broader wings, the first seven marginal cells of the fore wings being clouded much as in *Tibicen superba* Fitch. The dorsal markings are quite green in color, the central, green, wedge-shaped mark on the pronotum is not separated from the hind margin, but is confluent with it; the collar is bright green. The dorsal surface is less rusty in appearance than in typical *davisi*. Beneath the abdomen is greenish, without the "narrow black portion in the center," as in typical *davisi*.

In addition to the type and allotype we have a female from Hot Springs, Arkansas, September, 1917 (M. R. Harrington).

We figure a typical *T. davisi* from North Carolina, and the type of var. *harnedi*.

## MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	33	30
Width of head across eyes .....	13.5	14
Expanse of fore wings .....	81	87
Greatest width of fore wing.....	13	13
Greatest width of operculum.....	6	

*Tibicen davisi* occurs throughout the southeastern states as far north as New Jersey. Its song is a continuous *z-ing* of short duration, and is more sharp in tone, though not as loud as that produced by the larger, related black species.

*Tibicen similaris* (Smith & Grossbeck). Pl. VIII, fig. 2.

Agricultural College, October 11, 1914, male, October 14, 1914, female, and "summer," male. Anner, summer, 1916, male (H. P. Smith); Kiln, summer, 1916, male (H. W. Lee).

This species occurs from Mississippi to Virginia, and is very common in parts of Florida, where it may be heard singing in the small turkey oaks and elsewhere. In fresh specimens there is a pruinose lateral mark along the base of the abdomen often observable when the insect is in flight.

*Tibicen lyricen* (De Geer). Pl. VIII, fig. 1.

Red Bank, August, 1917, male (J. G. Kizer); Logtown, summer, 1917, female (A. Lutken); Rienzi, August 23, 1915, male (H. Y. Jumper).

This is a widely distributed insect in the eastern half of the United States, being found from Texas to Florida, and Kansas to Massachusetts. In the higher parts of Virginia, North Carolina, Tennessee and Georgia, the variety *engelhardti* (Davis) is the prevailing form of the species. This is characterized by having the pronotum and mesonotum nearly all black, except for the somewhat anchor-shaped, tawny spot on the former. It will perhaps be found in the uplands of Mississippi.

The song of *lyricen* is a rather monotonous *zing*.

*Tibicen sayi* (Smith & Grossbeck).

Figured in Howard's Insect Book under the name of *tibicen*, Pl. 27, fig. 20.

This is probably the most common of the large cicadas found in Mississippi, and has been reported from all parts of the state. Eighty-one specimens have been examined, and the dates of capture are from June to September, but it will also be found in October. The localities from which these specimens came arranged from north to south are: Nesbitt, Kossuth, Corinth, Coldwater, Blue Mountain, Sledge, Ratliff, Charleston, Houka, Pace, Buena Vista, Cleveland, O'Reilly, Pheba, Greenville, Leland, Winona, Vaiden, Long View, Sturgis, Agricultural College, Columbus, McCool, Goodman, DeKalb, Ferns Springs, Flora, Jackson, Forkville, Lake, Vimville, Montrose, Fayette, Ellisville, Columbia, Hattiesburg, McComb, Picayune, Anner and Kiln.

This species is distributed over most of the eastern half of the United States from eastern Texas and Kansas northward to Michigan and New York. We have collected it as far south as the Caloosahatchee River, Florida. The variety *australis* Davis, which is much greener colored, occurs not uncommonly in parts of Florida and Georgia, and should be found in Mississippi.

The song of this species is more impetuous than that of most of the related species, rising to a rapid *zing* and then gradually subsiding.

***Tibicen resonans* (Walker).**

Figured in JOURNAL N. Y. ENTO. SOC., March, 1915, Pl. I, fig. 2.

Agricultural College, July 11, 1914, male (G. W. Bacot); October 14, 1914, male (W. E. Vernon); female of no date (J. C. Holton); Ora, July 20, 1914, male (F. Rogers); Laurel, July 17, 1916, female, and August 12, 1916, male (M. G. Dyess); Ellisville, August, 1916, male (O. W. Collins); Clara, July 21, 1916, female (F. B. Pittman); Hattiesburg, August, 1916, female (W. H. Cook) and August 13, 1916, female (T. R. Hearon); Columbia, July, 1915, female (B. Morris); Wiggins, August 16, 1916, male (H. T. Powers). Caesar, summer, 1916, male and three females (R. H. Stewart); Anner, July, 1915, female (H. P. Smith), and male without date (R. H. Stewart); Kiln, summer, 1916, two males (H. W. Lee), and July, 1915, female (A. B. Curet); Ocean Springs, September 13, 1915 (C. E. Wilson).

So far no specimens have been reported from further north than Agricultural College, but as the insect is found in the sand ridges in



North Carolina, there is no reason why it should not occur quite far north in Mississippi, provided soil conditions are right.

**Tibicen figurata** (Walker).

Figured in JOURNAL N. Y. ENTO. SOC., March, 1916, Pl. 3, fig. 1.

Quincy, August 8, 1915, female (K. L. Cockerham); Montgomery Co., summer, female, and July 29, 1916, female (L. J. Liston); Longview, August 30, 1916, female (F. Oswalt); Agricultural College, August, 1916, female (N. C. Oakes), and October 19, 1916, female (C. C. Greer); West, July, 1915, female (F. L. Craft); Meridian, September 10, 1915, female (Rehn & Hebard); Gloster, May 17, 1916 (C. F. Yllander); Anner, summer, 1916, female on pine (H. P. Smith).

So far this species has been examined only from Arkansas, Louisiana, Mississippi, Alabama and Florida.

**Tibicen auletes** (Germar).

Figured in JOURNAL N. Y. ENTO. SOC., March, 1915, Pl. 1, fig. 1; Howard's Insect Book, under name of *marginata*, Pl. 28, fig. 19.

This is an abundant species in Mississippi and forty-seven specimens have been examined, the dates of capture ranging from June to November. The June record is for a female collected at Lake in 1916, by W. C. Parker, and the November 4, 1916, record is a female from Agricultural College, collected by J. E. Vaughn. The other localities are Red Banks, Iuka, Coldwater, Okolona, Webb, Egypt, Walthall, Lexington, Flora, Jackson, Meridian, Stonewall, Ollie, Mount Olive, Ellisville, Laurel, Columbia, Hattiesburg, Moselle, Ovet, Picayune, Anner, Gulfport and Ocean Springs.

This species is widely distributed, being found from eastern Kansas and Nebraska to Michigan and Massachusetts, and southward along the coast to Florida.

Its song is monotonous in tone and not loud, considering the size of the insect. It often commences to sing late in the afternoon and continues off and on until dark.

**Tibicen resh** (Haldeman).

Figured in JOURNAL N. Y. ENTO. SOC., March, 1915, Pl. 1, fig. 3.

Greenville, August 17, 1916, male (W. M. Crumpton); Fayette, July 25, 1917 (J. T. Shelton).

Specimens from Kansas, Missouri, Oklahoma, Arkansas, Alabama, Louisiana, and a great many from Texas, have been examined in addition to those mentioned above. The type locality given by Haldeman is "the Great Salt Lake Valley," but no cicada filling the description has been seen by the writer from Utah. In the preface to his article containing the original description, Haldeman states that owing to the small number of insects collected by the Stansbury expedition, specimens from Texas have been included in his paper, so there may be an error in locality. If in time a species from Utah is found that more closely fills the description of *resh*, we still have the name of *robertsonii* Fitch for the Mississippi insect.

***Tibicen marginalis* (Walker).**

*Cicada marginata* Say.

Figured in JOURNAL N. Y. ENTO. SOC., March, 1915, Pl. 2, fig. 1, and December, 1915, Pl. 18, fig. 2.

Nesbitt, August, 1915, male (L. E. Lea), Flora, August, 1916, male (H. B. Greaves); Hattiesburg, September 11, 1915, male and female on willow (Rehn and Hebard); two males with no labels.

This species seems to be more particularly confined to the central part of the United States, reaching northward to Kansas and Iowa, and eastward to western Ohio, Kentucky and Tennessee.

***Tibicen olympusa* (Walker).**

*Cicada sordidata* Uhler.

Figured in JOURNAL N. Y. ENTO. SOC., March, 1916, Pl. 5, fig. 5.

Long Beach, July, 1916, two males (W. J. Frederick). While this is so far the most western record, the insect will probably be found in Louisiana. It is common in Florida, especially near the coast, occurs in southern Georgia, and Mr. H. P. Loding has sent me four males from Mobile, Alabama, collected July 2, 1916.

In this, as well as in probably all the remaining species of *Tibicen* here mentioned, the song may last for a long time. In the present species it much resembles the stridulation of some of the *Neoconocephalus* grasshoppers or Tettigoniidae.

*Tibicen delicata* (Osborn), found in Louisiana and Texas, may possibly be found also in Mississippi. It is figured in the JOURNAL N. Y. ENTO. SOC., March, 1916, Pl. 6, fig. 2.

***Tibicen viridifascia* (Walker).**

*Cicada reperta* Uhler.

Figured in JOURNAL N. Y. ENTO. Soc., March, 1916, Pl. 6, fig. 1.

Long Beach, July, 1916, female (W. J. Frederick); Ship Island, August 24, 1915, female (Rehn and Hebard).

The specimens from Mississippi so far examined belong to the variety *bequaerti* Davis, though not typical, described and figured in the JOURNAL N. Y. ENTO. Soc., December, 1917.

*Tibicen viridifascia* occurs from Virginia southward along the coast, and is quite common in eastern Florida. The song is continuous and may be rendered *zeckie, zeckie, zeckie*.

***Tibicen vittipennis* (Say).**

*Cicada erratica* Osborn.

Figured in JOURNAL N. Y. ENTO. Soc., March, 1916, Pl. 6, figs. 3 and 4.

Friar's Point, July 2, 1910, male (E. C. Crockett); Saltillo, summer, female, collected in the middle of a large swampy woods (T. P. Cassidy); Rosebloom, August, 1915, female (Rex Buchanan); Greenville, June, 1916, male and female (W. F. Wheatley); July 12, 1916, female (G. S. Vincient), and August, 1916, female (W. H. McClain); Lexington, September 1, 1916, female (Wm. W. Broome); Vicksburg, July, 1915, female (E. L. Brien), and July, 1916, two females (A. E. Bonnelly); Palmyra, July, 1912, five males and five females (R. N. Lobdell). In addition to the above mentioned Mr. Lobdell has personally sent to the writer three males and two females, also some pupæ and pupæ cases "collected during July at Palmyra Island, Mississippi," which he states is subjected to periods of inundation, so the young insects are evidently able to live in very wet soil.

Prof. R. W. Harned has contributed the following note: "In regard to the distribution of *Tibicen vittipennis* I am inclined to think that this insect will only be found on low ground or in swampy places. This insect seems to be fairly prevalent in what is known as the delta section of Mississippi or the Yazoo-Mississippi Delta. This is the alluvial western part of the state. This species is also fairly abundant in similar soils in Arkansas and Louisiana. The first time that I ever noticed this species was late in June, 1912. I found them quite numerous in fields at Palmyra Island, south of Vicksburg. I

was surprised to find them coming out of the ground several hundred yards away from any perennial plants. They were also emerging from soil that had been under water a few weeks before. The species is quite common in the cotton fields of the delta."

The distribution seems to be confined to the central United States. Specimens have been examined from Mississippi, Louisiana, Arkansas, Oklahoma, Kansas, Nebraska and Indiana.

***Cicada hieroglyphica* Say.**

Figured in JOURNAL N. Y. ENTO. SOC., March, 1916, Pl. 6, fig. 5, and Howard's Insect Book, Pl. 28, fig. 11.

Corinth, summer, 1917, male (R. M. Lancaster). Osyka, June 12, 1914, male (E. A. Morgan); Pascagoula, June 10, 1915, female (R. O. Vaughn).

Occurs from Riverhead, Long Island, N. Y., to eastern Kansas and southward. In peninsular Florida the variety *johannis* Walker replaces the typical form. The black marks on the head, pronotum and mesonotum are more in the form of spots than of continuous lines as in typical *hieroglyphica*.

The song does not continue long, but sometimes, as in the Pine Barrens of New Jersey, the insects appear in numbers, when their united effort produces a considerable noise.

***Tibicina septendecim* (Linnæus).**

Figured in Howard's Insect Book, Pl. 27, fig. 16.

Only the thirteen-year race is known from Mississippi, and the following notes on distribution within the state have been taken from Bulletin No. 71, U. S. Dept. of Agriculture, Bureau of Entomology, 1907, C. L. Marlatt:

Brood XIX (1907-1920); fairly well distributed over the state.

Brood XXI (1909-1922); recorded from the eastern part of the state only.

Brood XXII (1910-1923); southwestern Mississippi.

Brood XXIII (1911-1924); distributed over the state but particularly in the northern half.

Brood XXIV (1912-1925); recorded from Franklin and Holmes counties.

Brood XXVI (1914-1927); "an outpost in Mississippi is also

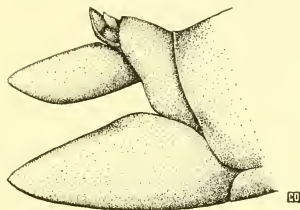
reported by Mr. George H. Kent, Suffolk, Franklin county, who reports their appearance throughout the southwestern portion of the county in the month of May."

Brood XXVII (1915-1928); "a small brood was reported for Franklin County, Miss., as appearing about May 20, 1902, by Mr. George H. Kent, of Suffolk."

Variety *cassinii* (Fisher) is smaller than the typical form, with the ventral surface of the abdomen generally much darker in color.

**Okanagana viridis** new species. Pl. VIII, figs. 4 and 5.

Type male, O'Reilly, Mississippi, July 10, 1917 (Ernest Wal-dauer)). Davis collection.



*Okanagana viridis*

A green insect, almost unicolorous, with the membranes or flaps at the base of the wings yellowish. The venation of the wings is green, except the costal margin, which is yellowish to the end of the radial cell. The basal cell is nearly clear. There is also a slight indication of yellow about the head, the tympana and the uncus. The front of the head is rounded and not prominent, the eyes are not prominent, and the uncus is straight, as shown in the figure. Beneath the insect is green about the head and fore legs, and yellowish green centrally to the end of the valve. The sides are green. The colors are the same in both the type and allotype. The notch in the last ventral segment of the abdomen of the female is simple, that is not doubly notched as in some species of *Okanagana*.

MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	25	22
Width of head across eyes .....	7.5	7.6
Expanse of fore wings .....	64	64
Greatest width of fore wing .....	10	10
Greatest width of operculum .....	2	
Length of valve .....	4.5	

Allotype female of same locality and date. Collection Mississippi Agricultural and Mechanical College.

In coloring this is a remarkable species and reminds one of the green phases of *Melampsalta calliope* to be found in Florida and elsewhere. Mr. Waldauer writes as follows of the capture of the insects: "At the time, July 10, 1917, I was working a crew of day hands in a piece of new ground corn, about one mile northwest of the Yazoo and Mississippi Valley railroad station at O'Reilly, Mississippi. One member of my crew was attracted by the singing of one of these insects and knowing that I was making a collection called my attention to the same. Upon investigation I found one of these cicadas on the under side of a blade of corn. This was evidently the male. Near this place in the same field, a few minutes later I found the other."

**Melampsalta calliope** (Walker).

*Cicada parvula* Say.

Figured in Howard's Insect Book, Pl. 28, fig. 8.

Thirty-one specimens have been examined, the dates of capture ranging from May 14, 1915, at Fontainebleau (J. Chaffin), to August 5, 1916, Hattiesburg (T. R. Hearon). The other localities are: Houlika, Verona, Egypt, Stonewall, Laurel, Columbia, Lucedale, Anner, Caesar, Ocean Springs, Kiln, Long Beach, Nugent and Pascagoula.

This is the smallest cicada occurring in the state, and is rather plentiful, as indicated by the above records. The species has a wide distribution and shows considerable variation. The females are generally a little larger than the males and with broader heads. There are both green and brown individuals. *Cicada calliope* Walker was described from North Carolina; *Cicada parvula* Say was described from Missouri, probably that part of it now included in eastern Kansas.

EXPLANATION OF PLATES.

Plate VII.

Fig. 1. *Tibicen linnei* (Smith & Grossbeck).

Fig. 2. *Tibicen canicularis* (Harris).

Fig. 3. *Tibicen davisi* (Smith & Grossbeck).

Fig. 4. *Tibicen davisi* var. *harnedi* Davis. Type.



Cicada.







Cicada.



## Plate VIII.

- Fig. 1. *Tibicen lyricen* (De Geer).  
Fig. 2. *Tibicen similis* (Smith & Grossbeck).  
Fig. 3. *Tibicen biconica* (Walker).  
Fig. 4. *Okanagana viridis* Davis. Type.  
Fig. 5. *Okanagana viridis* Davis. Allotype.

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## THE HOME OF HORMOPS AND ITS PROPER POSITION AMONG OTHER RHYNCHOPHORA.

BY W. S. BLATCHLEY,

INDIANAPOLIS, INDIANA.

Anyone who has had much experience in collecting Coleoptera knows that one of the most successful methods of taking them is by beating into an inverted umbrella. Aside from the use of the sweep-net, more species can be secured by beating than by any other method of collecting and in general the species so taken are more apt to be rare or especially desirable than those taken with the net.

In beating, however, much rubbish, as dead leaves, twigs, etc., falls into the umbrella, so that it is often half full or more of débris among and beneath which many of the beetles attempt to hide, while others, more active, crawl to its top and take quickly to wing. All of us remember how often many a fine specimen has suddenly appeared and escaped while we were attempting to balance the ungainly receptacle on some support, and perhaps at the same time trying to bottle an example of a rather common and much less desired species. The collector can only make a wry face and perhaps utter a cuss word as he sees the prize slip away, but neither the facial expression nor the expletive will lure it back.

It has been my custom, and perhaps is that of most collectors, to sort over in a rather crude manner this débris and pitch it over the side onto the ground, taking meanwhile any desired individual uncovered, and finally reaching the "pay dirt" at the bottom, among which the smaller and often the rarer species are to be found. In so doing we have doubtless cast aside many a rare specimen whose color and lack of movement did not betray its presence.

In Florida, during the winter months, I have found umbrella collecting a most excellent method of securing beetles which at that season live in or on dead branches, among bunches of dead leaves and in the pendent masses of Spanish moss. Many kinds of Elateridæ, Tenebrionidæ, and especially Anthribidæ, Curculionidæ and Scolytidæ have thus been taken which would have been gotten in no other way. Although oak, bay, pine and numerous other kinds of trees and shrubs are there dressed in their evergreen foliage throughout the winter, yet beating this foliage at that season yields far fewer species than does the dead and dry material above mentioned, for, during the winter months, most of the beetles are not active and feeding but dormant and hibernating beneath the most available cover.

On February 11, 1918, I spent the afternoon collecting in and about the edges of Skinner's Hammock, a densely wooded wet tract of several hundred acres located about one mile northeast of Dune-din, Florida. I had with me both sweep-net and umbrella, using the former on the numerous ferns and other low herbage growing beneath the tall bay and oak trees of the hammock, as from this undergrowth I have swept many rare species of Anthicidæ and other families. The beating among the tangled undergrowth of the hammock is strenuous, for

Overhead the wandering ivy and vine,  
This way and that, in many a wild festoon  
Run riot,

and having had three hours or more of it I was ready to quit after one more trial. I was then near the northwest corner of the hammock and within fifty yards of where I had the winter before found *Monædus guttatus* Lec. in numbers on the tangled masses of the slender twining milkweed, *Metastelma scoparia* Nutt. In making the final beating I struck a number of living as well as numerous dead branches, and also the edges of a large bunch of dead leaves and fine twigs, whose base, about eight feet above the ground, was supported by a tangle of the branches of an *Ampelopsis*, a vine of the grape family. Finding the umbrella more than half full of débris, through a sudden impulse, and for the first time in all my collecting, I spread out a small rubber blanket which I carry with me and as I searched the contents, threw the refuse onto the blanket instead of on the ground.

There was little of interest in the umbrella but on searching over the material on the blanket I found at the bottom of it two weevils, one rather large one, *Conotrachelus serpentinus* Boh., not uncommon in the hammock on the red bay, *Persca borbonia* L., the other a much smaller uniform brown species which I did not recognize, but as it was then late I made no farther search for additional specimens. Being very tired that evening when I assorted the afternoon's catch, I gave little attention to the weevil, but placed it in a capsule with an accession number and for the corresponding note wrote: "Curculid new to collection ?, beating in Skinner's Hammock near big maple."

Four days later, February 15, I was back at the hammock, one of my objects being to obtain if possible additional specimens of the weevil. I did not know from just what I had beaten it, but I knew the spot and thought the bunch of débris in the vine, which was twice as large as a bushel basket, a likely abiding place, so I tackled it the first thing. My surmise was correct, for after two beatings, during which I knocked down half the bunch, I had found eighteen of the weevils, partly in the umbrella and partly on the blanket, which I was careful to spread out to catch the discarded material. The beetles were at all times very difficult to see, being almost the color of the dead leaves and twigs and feigning death for a long time. When one of them finally concluded to "come to" it moved more slowly than any weevil I have ever known, and it was only by watching for motion, much as one does when using a sifting net, that it was discerned.

That evening I took my copy of the "Rhynchophora of N. E. America," and in a few minutes discovered that I had captured a real prize, it being none other than *Hormops abduzens* Lec., described<sup>1</sup> forty-two years before from a single specimen taken at Capron, Fla., by Hubbard and Schwarz and otherwise known by only one other specimen, the latter beaten by Schwarz from a dead branch on Plummer's Island, Md. It was from this Maryland specimen in the U. S. National Museum collection that the description in the "Rhynchophora of N. E. America" was in part drawn up.

The next day, February 16, found me back at the hammock, determined to make a "clean-up." I first went over the débris which I

<sup>1</sup> In "The Rhynchophora of America North of Mexico," 1876, 321.

had cast aside into a heap the day before, crushing it into finer bits over the rubber blanket. From this I got ten specimens which had escaped my previous search. I then cut a long pole and beat down the remainder of the original home, getting therefrom twenty-five additional specimens. I had, therefore, secured altogether fifty-four of the weevils from the one bunch or colony, and put the species securely on the map as an inhabitant of Florida. During the six winters I have spent at Dunedin, I have beaten similar bunches of dead leaves and twigs many times, not only in Skinner's Hammock but in numerous others, and had never happened upon *Hormops*. Why it waxed fat and flourished in numbers in that one particular bunch of rubbish only the fates and the weevils know and they are forever silent.

I sent a brief announcement of my discovery and a pair of the weevils to friend Leng, and shortly afterward left for a collecting trip in the Okeechobee region. When I returned three weeks later I found awaiting me a letter from him saying: "I certainly congratulate you upon this remarkable capture and it happens most opportunely, for Dr. David Sharp is at work upon an exhaustive study of the genitalia of weevils and I have been trying to supply him with the genera he lacked, of which, of course, *Hormops* was one. He says that specimens killed in ether and afterwards transferred to distilled water give much better results than dried specimens, because in such the delicate muscles are too stiff for manipulation under the microscope. I hope that you may be able to find more of this interesting insect, so as to send Dr. Sharp specimens killed as he suggests."

Now both ether and distilled water were difficult to obtain about Dunedin, and I concluded that the best thing I could do would be to try and find some living specimens and send them to Dr. Sharp. On the day after my return, therefore, I sought again the hammock, and, working over the old pile of débris, found three more specimens which I started alive across the Atlantic to him. Taking home three or four quarts of the comminuted rubbish, I put it into some covered jars, and later, on each of two different occasions, found in it a pair of the beetles, the total catch for the season being sixty-one individuals. It is probable that the weevils had clung closely to one side or hidden beneath a folded edge of a leaf, and so escaped observation. It is possible also that some were in the pupal stage and emerged as adults

during the six weeks the débris was under investigation, though no larvæ or pupæ were seen at any time.

The beetle is but 3.5 to 4 mm. in length, dark reddish-brown in hue and thinly clothed with long, prostrate yellow hairs. It is the more interesting in that it is the sole representative of the tribe Hormopini, the principal distinguishing character of which is the very large eyes which are coarsely granulated, widely separated and almost invisible above and nearly contiguous beneath. This character led Dr. LeConte (*loc. cit.*) to make the following remarks regarding its relationship to other weevils:

"The subfamily of genuine *Curculioninæ* fitly closes with a very anomalous insect, which while having relations with several of the earlier tribes, exhibits in addition a character which is otherwise seen in one of the subfamilies of the *Calandridæ*." He then described this character, viz., the peculiar eyes above mentioned, and after giving an extended description of the tribe adds: "It is possible that this insect may have relation with some of the anomalous genera placed by Mr. Wollaston among the *Cossonidæ*, but as I have had no opportunity of studying them in nature, I can but timidly suggest the propriety of comparing this genus with those genera of *Cossonidæ* in which the eyes are disposed to become confluent beneath. The entire facies of this insect is so purely Curculionideous that (the sexual characters being unknown) I would be unwilling to place it in any other family."

In the "Rhynchophora of N. E. America" Mr. Leng, to whom fell largely the arrangement of the primary divisions into subfamilies and tribes,<sup>1</sup> retained the insect in the subfamily Curculioninæ, but placed the tribe Hormopini between the Hylobiini and Erirhinini, this placement being largely based on the form of the antennæ.

After returning to Indianapolis I had a letter from Dr. Sharp, who lives in Brockenhurst, England, and, in spite of his advanced years, is still an active and enthusiastic worker. He wrote: "I have been in London for some weeks and on returning home find the *Hormops* you were so good as to send, two males and one female. One of the males was dead, the other pair alive, though five weeks in the little vial. I give a description of the genital structure, which is Cossonid-like, as follows:

<sup>1</sup> See p. 5 of that work.

"Eighth ventral divided into two transverse plates; eighth dorsal voluminous, the hind margin not reflexed in the middle, but distinctly so at the sides. Spiculum long and slender. Tegmen forming a slender capacious ring, the junction of the sides being V-like, and not prolonged as a strut; superior appendages apparently obsolete. Median lobe very peculiar, broad, rather short, very strongly arched, lower face prolonged and truncate; upper face membranous and transparent, allowing a complex armature of the sac to be seen; struts as long as the body, slender, strongly elbowed, but with the point of attachment only membranous.

"If the sac could be everted and restored to the functional condition it would be very interesting, as the armature is clearly very remarkable.

"I find the creature to be an aberrant genus of *Cossonidæ*; it should stand as a separate group *Hormopini*, somewhere near *Rhyncholini*. It has not the slightest relation to *Calandridæ*. In Wollaston's *System* it would come somewhere near *Tomolips*, but according to Champion in the *Biologia* that has a 5-jointed funiculus, though Wollaston placed it in the 7-jointed lot; he knew, however, that it had only 5!"

It will thus be seen that Dr. LeConte was wrong in placing this curious weevil in the subfamily *Curculioninæ* and wrong also in supposing that it was closely related to the *Calandridæ*, but right in his supposition that it might be closely related to some of Wollaston's genera. Since he had only a single specimen for examination, his error can be readily condoned. I am not sure that Mr. Leng had access to even one specimen when he placed the tribe near the *Eirrhini*. Certain it is that in antennal characters and general facies it bears a close resemblance to several of the genera of the subtribe *Eirrhini* of that group. Now that Dr. Sharp has, by his examination of the male genitalia, fixed its relationship, it can without question be given its proper location in our future lists of American *Coleoptera*.

My discovery of the colony of this weevil was purely an accident, based upon the impulse to spread out a blanket and so search more closely the cast away material from an umbrella. Such discoveries are the chief joys of a naturalist's life, and give true zest to his outings. As Thoreau has somewhere said: "We look for a thing for a long time and at last come upon the whole family all at once at



dinner." While not looking for *Hormops*, I was overjoyed at meeting it and its capture will long be remembered as one of the most interesting episodes of my collecting days.

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## A REVIEW OF THE SPECIES OF THE COLEOPTEROUS GENUS *SILIS* LATR. WHICH ARE FOUND IN AMERICA NORTH OF MEXICO.

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In this paper are included under *Silis*, not only all of those species which were listed as such by LeConte in his last revision,<sup>1</sup> but also those of *Ditemnus* Lec., for as has been shown by Gorham, Pic., Champion, and other recent workers, the members of the one grade gradually into the other. As stated by Champion,<sup>2</sup> the latest to discuss the genus, *Silis* may be defined as having the "prothorax with the lateral margins incised or constricted at or towards the base, and sometimes (*Ditemnus*) deeply incised at about the middle also, the margins more or less lobed, lamellate, or dentate, the lobes often imbricate, the tarsal claws unclawed, and the seventh ventral segment divided down the middle in ♂." In our fauna, two related genera, *Discodon* Gorh. and *Polemios* Lec., which have in common with it the divided seventh ventral segment in the male, form with it the group Silini. The genus presents many attractive features such as the peculiar prothoracic armature in the males, the dichromatic and polychromatic races, and the peculiarities of distribution. The armature is often grotesque in structure, is always of a distinctive type in each species and so most useful in classification, and no doubt houses certain of the special sense papillæ. The female as a rule is without any indication of this structure, having a prothorax with simple outlines. She is, therefore, hard to definitely identify unless found in

<sup>1</sup> "Synopsis of the Lampyridæ of the United States," by John L. LeConte, M.D., Trans. Am. Ent. Soc., Vol. IX (1881), pp. 56 and 57.

<sup>2</sup> "Revision of the Mexican and Central American Telephorinæ (Fam. Telephoridæ), with descriptions of new species," by George Charles Champion, F.Z.S., Trans. Ent. Soc. London, Vol. 1915, p. 99.

association with her mate. In the eastern and southern parts of the country the species are very constant as to color but on the Pacific coast certain of them are very plastic. Some are truly dichromatic, with the two color phases in the same territory. Others have their different color varieties in different though adjacent territories, true color races, while still others have intermediate as well as the extreme color phases within the same territory and are thus only variable species. This color plasticity is no doubt due to climatic influences for other groups of Coleoptera within the same region share it, such as *Pedilus* (*Corphyra*) and certain of the Elateridæ such as some *Athous*, *Limonius* and *Agriotes*. The lighter colored phases are generally to be found in the warmer lowlands while the darker are more restricted to the cooler coastal areas and the high mountains. Another peculiarity with regard to the distribution of this genus is that many of the more or less isolated mountain ranges of the southwest are apt to have their own distinctive species.

The genus as now constituted is world wide in its distribution. There are, however, certain groups which seem to be more or less definitely restricted to certain localities. With us, the species of the more typical part of the genus, those with the prothoracic armature about or close to the posterior angles, are dominant on the Pacific Slope, but three species being found in the more northern or mountainous part of the Eastern States. Those which belong to the subgenus *Ditemnus* and have the prothoracic armature distinctly in front of the posterior angles, are more southern as a rule in their distribution and quite closely related as a group to those in Mexico and farther south. As to color, the members of this latter group are generally bicolored, but one species in our fauna being entirely black, and quite constant as far as our species are concerned.

The prothoracic armature in general is formed by a portion of the posterior part of the lateral margin of the prothorax being incised and bounded in front by an angular process or an extension outwards of the same in the form of a lobe, and bounded posteriorly by another process which projects outwardly from the side itself or from just beneath. This latter may be in the form of a spine, a lobe, or a broad plate, sometimes so large as to completely fill up the incisure. The inner surfaces of these lobes are usually fringed with fine erect hairs. The construction of this body varies with each

species and is in fact the most conspicuous differential character, so the details of its structure are particularly dwelt upon in the definition of the species.

In this paper, complete descriptions of only the new species will be given. The others will, however, be discussed in some detail which, with the synoptic table and outline drawings of the male prothorax, will, I think, make their identification possible. A large number of specimens has been at my disposal and served as the basis for this paper. Besides my own large series, chiefly from the Pacific Coast, I have examined the specimens in the collections of Dr. F. E. Blaisdell, Mr. H. C. Fall, Mr. Ralph Hopping, Cornell University, and the bulk of those in the United States National Museum, the last received through the courtesy of Dr. E. A. Schwarz and Mr. H. S. Barber. The LeConte types in the Museum of Comparative Zoölogy at Harvard University, I have also been enabled to study through the kindness of Mr. Samuel Henshaw and Mr. Nathan Banks, and have likewise seen accurately determined specimens of Mr. Charles Schaeffer's species received through the generosity of the describer himself. To the above-mentioned institutions and friends, as well as others who have helped me in my work, I therefore now wish to express my thanks.

TABLE FOR THE DETERMINATION OF THE SPECIES OF SILIS LATR.  
BASED MAINLY UPON MALE CHARACTERS.

Lateral prothoracic armature situated at or close to the hind angles.....	1
Lateral prothoracic armature situated distinctly in front of the hind angles ( <i>Ditemnus</i> Lec.) .....	18
1—The posterior appendage of the armature slightly ante-basal and conspicuously spinose .....	2
The posterior appendage of the armature either basal or slightly ante-basal but not sharply spinose .....	5
2—Prothorax narrower than base of elytra and with the process in the form of a broad plate derived from the side of the prothorax and to a great extent filling the incisure, its outer face prolonged into a superior horizontal spine and an inferior prong, the latter close to the hind angle of the prothorax. Length 8 mm. ....	3
Prothorax fully as wide at base as base of elytra and with a distinct ante-basal process that is spiniform and that arises close to but below the posterior angles. Length 6-7 mm. ....	4
3—Yellow testaceous, head, antennæ, and legs more or less dusky, prothorax orange yellow. Length 8 mm. (Or., high Sierras of Cal., and Utah) .....	<i>S. spinigera</i> Lec.

- Black with orange yellow prothorax. (Atlanta, Ida., Garland, Col., and high Sierras of Cal.) ..... *S. spinigera* var. *munita* Lec.
- 4—Black with disc of prothorax reddish yellow. (L. Superior, Hudson Bay Region, Col., N. Mex., Northern Ariz., Cascades of Wash., Kaweah, Cal.) ..... *S. difficilis* Lec.
- Black with pronotum orange and elytra except apices and most of legs testaceous. (Cascades and Sierra Nevada Mts.)
- S. difficilis* var. *flavida* Lec.
- Entirely black. (Very high Southern Sierras of Cal.)
- S. difficilis* var. *carbo* n. var.
- 5—The anterior angle of armature not conspicuously projecting, the posterior appendage always slightly ante-basal, at least at origin.....6
- The anterior angle of armature formed into a more or less projecting appendage, the posterior appendage basal .....15
- 6—The ante-basal process a more or less compressed process, blunt at apex..7
- The ante-basal process a mere filament.....13
- 7—The lateral incisure narrow and moderately deep .....8
- The lateral incisure broad .....10
- 8—Ante-basal process arising close to base, moderately long, narrow and straight, but blunt at apex, antennæ over  $\frac{3}{4}$  length of body, color entirely black. Length 5 mm. (Wash., Mt. Jefferson, Ore.).. *S. atra* Lec.
- Ante-basal process broad, antennæ barely reaching  $\frac{3}{4}$  length of body....9
- 9—Upper surface pale yellow, ante-basal process straight and rather long, elytra simply punctured. Length 5-7 mm. (Western Ore. and most of Cal.) ..... *S. cava* Lec.
- Upper surface black with disc of pronotum yellow, ante-basal process short and curved, elytra scabrous. Length 4.5 mm. (Coastal area of North, Cal.) ..... *S. rugosa* n. sp.
- 10—The incisure deep, the ante-basal process long, broad, and hardly curved, black with disc of prothorax orange, antennæ barely reaching  $\frac{3}{4}$  length of body. Length 5-6 mm. (Can., Mich., Ind., Ohio, Mass., Tex.) ..... *S. percomis* Say.
- The incisure shallow, the ante-basal process short, narrow, and curved forwards, antennæ longer than  $\frac{3}{4}$  of body .....11
- 11—Upper surface mostly pale yellow. Length 6 mm. (Western Ore. and north to Sitka, Alaska) ..... *S. pallida* Mann.
- Upper surface black except disc of pronotum which is orange margined with black .....12
- 12—Disc of prothorax without longitudinal impressed line, antennæ robust, elytra simply punctate, not rugose. Length 5 mm. (Coast belt of Oregon.) ..... *S. pallida* var. *maritima* n. var.
- Disc of prothorax with distinct longitudinal impression, antennæ finely filiform, elytra coarsely punctate and rugose. Length 5 mm. (Eastern Wash. and Ore. to Col.) ..... *S. vulnerata* Lec.
- 13—The ante-basal filamentous process long and curved, reaching the anterior angle and completely enclosing the incisure.....14

The ante-basal filamentous process very short and but slightly curved.

Length 4.75 mm. (Panamint Valley, Inyo Co., Cal.)...*S. filicornis* n. sp.

- 14—Upper surface mostly pale yellow. Length 5-6 mm. (Western Ore. and North. Cal.) .....*S. lutea* Lec.

Upper surface black with pronotal disc yellow. Length 5-6 mm.

(Locally along extreme coastal strip from Santa Barbara Cal. to Wash.) .....*S. lutea* var. *filigera* Lec.

- 15—Prothoracic incisure widely opened externally .....16

Prothoracic incisure almost completely closed by anterior and posterior process .....17

- 16—The anterior process angulated and directed slightly backwards, the posterior, long, straight, and narrow, directed directly outwards from beneath posterior angles. Length 7 mm. (Argus Mts., Cal.)

*S. deserticola* n. sp.

Both anterior and posterior processes lobed and directed outwards. Black with pronotum orange red. Length 4.5 mm. (Ill., Ind., East. N. Y. to N. Car.) .....*S. spatulata* Lec.

- 17—Apex of prothorax much narrower than base, sides widely diverging backwards, the anterior process of incisure projecting outwardly beyond normal side line of prothorax and curving backwards until it almost meets the basal process. Length 6-7 mm. (Northern Ariz.)

*S. arizonica* n. sp.

Apex of prothorax but little narrower than base, sides but slightly diverging backwards, the anterior process projecting obliquely backwards without interrupting the normal side line of prothorax and meeting the hook-like extension of the basal process. Length 5.5 mm. (San Jacinto Mts., Cal.) .....*S. fenestrata* n. sp.

- 18—Posterior margin of prothorax broadly rounded, posterior angles small but evident, both processes broad, the anterior always ear-like, the antennæ quite filiform .....19

Posterior margin of prothorax more or less truncate at middle, antennæ robust and quite serrate .....23

- 19—Disc of prothorax convex without deep median fossa .....20

Disc of prothorax with deep and broad median fossa .....22

- 20—Species bicolored, black and orange .....21

Species entirely black, the anterior and posterior processes both long and approaching each other, antennæ as long as the entire body. Length 6.5 mm. (Huachuca and Pinaleno Mts., Ariz.)...*S. nigerrima* Schaeef.

- 21—The anterior process not reaching the blunt triangular posterior process, the incisure therefore open, the antennæ reaching slightly beyond middle of body. Length 5 mm. (Huachuca and Chiricahua Mts., Ariz.)

*S. abdominalis* Schaeef.

The anterior process overlapping apex of long posterior process, thus making a fenestra of the incisure, the antennæ almost reaching end of body. Length 6 mm. (Tex.) .....*S. perforata* Lec.

- 22—The anterior process hardly projecting backwards, the posterior long,

- narrow, bifid at apex, and projecting obliquely backwards, the elytra margined with yellow. Length 4.5 mm. (Tex.) .....*S. fossiger* Lec.  
 The anterior process projecting well backwards and overlapping the posterior, the posterior a broad plate that ends outwardly in a blunt tooth and a sharp spine, elytra unicolorous. Length 3.75 mm. (Hot Springs, Ariz.) .....*S. tricornis* n. sp.
- 23—Prothorax entirely orange, apical margin of same reflexed and extended laterally, so as to form well defined lobes, the posterior process broader than the anterior (of armature), the pronotal disc with shallow lunar fossa .....24  
 Prothorax an orange-red margined with black, apical prothoracic margins less reflexed and not expanded laterally into lobes, the posterior process much narrower than anterior, the pronotal disc with shallow circular fossa .....25
- 24—Posterior process but little wider than the anterior, the posterior angles some distance from process, black with dull yellow prothorax. Length 3.5 mm. (Eastern States.) .....*S. bidentata* Say.  
 Posterior process more than twice the width of anterior, the posterior angles overlapping base of posterior process, black with reddish yellow prothorax. Length 4.5–5.5 mm. (Ind., Kan., Mo.)...*S. latiloba* Blatch.
- 25.—(Middle and Southern Cal.) .....*S. obtusa* Lec.

*Silis spinigera* Lec.

*Silis spinigera* Lec., Trans. Amer. Ent. Soc., Vol. V (1874), p. 61;

Trans. Amer. Ent. Soc., Vol. IX (1881), p. 56.

*Silis munita* Lec., Trans. Amer. Ent. Soc., Vol. IX (1881), p. 56.

These two, as surmised by LeConte, are merely color phases of one species. It is truly dichromatic in most parts of its range. It is also our largest species and the only one in which the prothorax of the male is always distinctly narrower than the base of the elytra. The eyes are prominent, together as broad as the interocular area; the antennæ fully three fourths the length of the body; the prothorax one fourth broader than long, with the sides slightly rounded in front and shallowly excavated at the posterior angles, the anterior boundary of the incisure rounded and the process a broad plate bifurcating externally into an anterior sharp horizontal spine and a posterior prong, the hind angles small and blunt, almost concealed by the prong of the process, the base broadly rounded, the disc feebly convex with the longitudinal impression defined posteriorly and a deep fovea just within the incisure as well as an acute tubercle just anterior; the elytra at base one fourth wider than prothorax and seven times as long and slightly scabrous. (Plate IX, fig. 1.)

In the original descriptions, the two spiny projections of the process were given as the anterior and posterior angles of the incisure, hence have misled those dependent upon them for their determination. I have therefore thought it best to redescribe it. Of the first, *spinigera*, I have seen besides the type from Oregon, specimens from the following localities in the Sierras of California, Lake Tahoe, Tuolumne Co., Mariposa Co., Fresno Co., and Tulare Co.; and of the second, *munita*, besides the type from Atlanta, Idaho, specimens from Lake Tahoe and the high Southern Sierras of Tulare Co., Cal., as well as from Utah and from Garland, Col.

***Silis difficilis* Lec.**

*Silis difficilis* Lec., Agassiz, L. Superior (1850), p. 230; Trans. Amer. Ent. Soc., Vol. V (1874), p. 60; Trans. Amer. Ent. Soc., Vol. IX (1881), p. 57.

*Silis flavida* Lec., Trans. Amer. Ent. Soc., Vol. V (1874), p. 61; Trans. Amer. Ent. Soc., Vol. IX (1881), p. 57.

After critically examining a large series of the two forms given above, I have finally come to the conclusion that they are only phases of one species. The first, *difficilis*, is black with the disc of the prothorax an orange red, and is to be found not only in the Lake Superior region but farther north into the old Hudson Bay Territory, south through the Rocky Mountains of Colorado and into New Mexico and northern Arizona, west into British Columbia, the Northern Cascades of Washington, and as a stray in the Southern Sierras of California, probably overlapping from Arizona. The Lake Superior and more northern specimens are apt to be slightly smaller, with prothorax less laterally expanded, the antennæ more filiform, and the elytra more scabrous than those of the Rockies and Cascade-Sierra ranges, though they grade into each other. *Flavida* is the light phase, found in the Northern Cascades and the high Sierras. On Mt. Ranier, Washington, I found it in company with the preceding phase, but in the major part of the Sierras it is found alone. In some of the specimens, the prothorax is apparently less broad and with the anterior angles of the incisure more obtuse than in typical specimens. Some specimens are also more densely pilose than others. In the LeConte collection the first specimen of *difficilis*, the one with the label, cannot be the type as it bears a New Mexico locality label. It was described as from the Lake Superior region. Specimen No. 2 is presumably the type. (Plate IX, fig. 3.)

*Silis difficilis* var. *carbo* new variety.

Size, shape, and sculpturing of *difficilis* but entirely black.

Type and paratype in my collection, the type from Bubbs Creek Canon, Kings River, California, altitude 9,700 feet, collected July 9, 1910, paratype Rea Lake, Fresno Co., Cal., altitude 10,500 feet, collected July 20, 1910. Besides these, I have twelve more specimens in my collection, all males, collected at the same general time and in the same region, the high Southern Sierras, and have also seen others in the collections of Mr. Ralph Hopping and of Cornell University, the specimen in the latter collected by Professor J. C. Bradley. This dark variety seems to somewhat replace the variety *flavida* at the higher altitudes of the Sierras.

*Silis atra* Lec.

*Silis atra* Lec., Trans. Amer. Ent. Soc., Vol. XII (1884), p. 22.

This species superficially resembles *S. difficilis* var. *carbo*, but it has a narrower and less explanate prothorax, with sides more parallel and straight, the incisure less deep and the marginal angles less pronounced, the ante-basal process shorter and blunt, not spiniform, the antennæ finer, and the size generally smaller. From *cava*, to which it is compared by LeConte, it differs not only in color, but in having longer antennæ, a more broadly opened incisure, and narrower ante-basal process.

*Silis cava* Lec.

*Silis cava* Lec., Trans. Amer. Ent. Soc., Vol. V (1874), p. 61; Trans. Amer. Ent. Soc., Vol. IX (1881), p. 57

We have in this species the palest member of the genus, it having the legs to a great extent yellow, a feature which the females share with the male. It is also quite constant in character and quite distinct. Its range is throughout most of the lowlands of western Oregon and northern and central California, and it invades the Sierras to a certain extent. Certain specimens from the hot slopes of Mt. Pinos, western Kern Co., Cal., are larger and lighter in color than the general run. (Plate IX, fig. 4.)

*Silis rugosa* new species.

Elongate, slightly shining, black with orange pronotum. Head as broad as apex of prothorax, depressed between the eyes; eyes moderately prominent and widely separated; antennæ three fourths length of body, quite filiform,



the median joints hardly serrate. Prothorax about one fourth broader than long, as broad as base of elytra, apex broadly rounded, sides straight in front and but slightly divergent backwards, moderately excavated posteriorly, the anterior angle of the incisure rounded, the posterior small but acute and decidedly carinated, the ante-basal process short, compressed, rounded at apex and slightly curved forwards, the base lobed, the disc feebly convex, with the longitudinal impression fairly well defined posteriorly, the basal foveæ rather shallow, and the anterior and posterior margins but moderately reflexed. Elytra about four times as long as prothorax, with sides quite straight but slightly diverging backwards, the disc scabrous and finely pilose. Beneath shining in front, abdomen finely transversely wrinkled and subopaque, the seventh ventral segment deeply excavated as usual. Length 4.5 mm., breadth 1.75 mm. (Plate IX, fig. 5.)

The female differs by having the prothorax orange with darker margining, the sides straight and almost parallel to the nonexcavated but obtuse hind angles, and the antennæ but about half the length of the body.

Type male and female in my collection, taken by myself on Mt. Tamalpais, Marin Co., Cal., March 14, 1909. A series of eighteen more specimens from the same locality and one specimen from Fort Bragg, Mendocino Co., Cal., collected December 21, 1914, are also in my collection, and I have seen besides good series from Marin Co., Cal., in the collection of Dr. F. E. Blaisdell.

This species is structurally closest to *cava* but easily separated from that by color as well as the details of the armature. Superficially it resembles *vulnerata* and *S. pallida* var. *maritima*, but can be distinguished by being smaller and proportionally shorter, by having the pronotum entirely orange except for a black margin, by having smaller and more filiform antennæ, the prothoracic incisure narrower and with the posterior angles of the same more prominent, the basal thoracic foveæ shallower, and the elytra decidedly scabrous, not merely punctate, a character which will assist in separating the females. It seems to be confined to the coastal belt of Middle California.

#### *Silis percomis* Say.

- Cantharis percomis* Say, Bost. Journ. Nat. Hist., Vol. I (1835), p. 159;  
Ed. Lec., Vol. II., p. 636.  
♀ *Podabrus curtus* Lec., Agass., L. Superior (1850), p. 229.  
♂ *Silis longicornis* Lec., Agass., L. Superior (1850), p. 230.  
*Silis percomis* Lec., Trans. Amer. Ent. Soc., Vol. V (1874), p. 61; Trans.  
Amer. Ent. Soc., Vol. IX (1881), p. 57.

This, apparently the most common of the species in northeastern America, varies but slightly. The anterior angles of the prothoracic incisure are somewhat more prominent in certain specimens than in others, where an approach is made towards the condition found in *spatulata*. In the latter, the angles are, however, definitely prolonged into lobes and the posterior processes proceed more definitely from the base. *Percomis* is to be found in the Great Lakes region and the northeastern tier of states. One specimen, from Texas in the National Museum collection, has been seen. In the LeConte collections the specimen bearing the names is not *percomis* but *spatulata*. Specimens two and three, the types of *longicornis* and *curtus*, are correctly placed. (Plate IX, fig. 6.)

***Silis pallida* Mann.**

*Silis pallida* Mann., Bull. Mosc., Vol. II (1843), p. 246.

*Silis pallida* Esch., Dej. Cat., 3 Ed., p. 121.

*Silis pallida* Lec., Trans. Amer. Ent. Soc., Vol. V (1874), pp. 60 and 62;  
Trans. Amer. Ent. Soc., Vol. IX (1881), p. 57.

This species is black with the pronotum orange margined with black and with a large median basal black spot as well, and the elytra of a light yellow suffused with black along the margins and at the apex. From other light species it can be readily separated by its shallow incisure and small slightly hooked ante-basal process. It ranges from Sitka, Alaska, the type locality, south through western British Columbia, Washington, and Oregon. In the last two, the typical form is most common in the country between the Cascades and the Coast Range Mountains, the melanotic variety taking its place west of the coastal mountains. Specimens from Sitka as well as good series from other parts of its territory have been seen. (Plate IX, fig. 7.)

***Silis pallida* var. *maritima* new variety.**

Elongate, shining, black with yellow mandibles and the sides and front of pronotal disc an orange yellow. Head as broad as apex of prothorax, depressed between the eyes; eyes moderately prominent and widely separated; antennæ fairly stout and almost reaching to apex of elytra. Prothorax broader than long, as broad as base of elytra, apex broadly rounded, sides in front almost straight and slightly diverging posteriorly, the region of the posterior angles shallowly incised, the anterior angle of the same obtuse and the posterior angles small and acute, with a small and short hook-like ante-basal process projecting outwards from just in front of the posterior angle,

the base broadly lobed, all margins reflexed, the disc with deep foveæ at base just within the incisures and with a shallow depression at middle but without a longitudinal impressed line. Elytra about four times length of prothorax, with sides almost parallel and apex quite truncate, the surface distinctly though discretely punctate, and finely, sparsely pilose. Length 5 mm., breadth 1.5 mm.

The female has the antennæ finer and shorter, barely reaching to the middle of the body, the prothorax larger than in the male, as usual distinctly broader at base than base of elytra, much broader at base than apex, with sides gradually arcuate to rounded basal angles, color entirely reddish yellow, the elytra somewhat broader than in male.

Type male and female in my collection, collected by myself at Marshfield, Oregon, June 11 and 12, 1914. Besides these, I have a series of thirty-three specimens in my collection, from the same place, all quite constant. This variety is exactly like *pallida* in every particular except color, differing in that in having the elytra entirely black instead of a pale yellow darker at the margins. Specimens of the typical species are occasionally found with the variety. *S. vulnerata* Lec. is very similar to the above but differs as a rule in having the median prothoracic black spot prolonged to the apex, thus completely dividing the reddish yellow area, in having finer and more filiform antennæ, the prothoracic incisure deeper, with its anterior angle a right angle, the ante-basal process broader and not hooked, the disc with a distinct though fine longitudinal impressed line, and the elytra more coarsely closely punctate and scabrous and with apices more broadly rounded.

#### *Silis vulnerata* Lec.

*Silis vulnerata* Lec., Trans. Amer. Ent. Soc., Vol V (1874), p. 61; Trans. Amer. Ent. Soc., Vol. IX (1881), p. 57.

This species which I at first took to be the same as the preceding, should, however, be readily separated once the very rugose elytra are noticed. It was described from Oregon. I have seen specimens from Pullman and Wawawai, Wash., Coeur d'Alene, Idaho, and from Colorado. It is probably an offshoot of *pallida*, but has diverged sufficiently to be quite distinct and has as its territory the upper part of the Great Basin, or the country east of the Cascades, as *pallida* and its variety, the region to the west.

**Silis filicornis** new species.

Elongate, delicate, slaty black with yellow prothorax. Head as broad as apex of prothorax, depressed between the eyes; eyes prominent; antennæ filiform, slender, extending almost to end of body. Prothorax about one fourth broader than long, apex broadly rounded, sides in front almost straight and slightly divergent backwards, the incisure but a small rectangular notch at the posterior angles, with a depressed lamina from the lateral margin forming its anterior boundary and a small thread-like process slightly curving forwards, its posterior boundary, this process only partially enclosing the incisure, the posterior angles blunt and not projecting, the disc with a slight longitudinal depression at middle, a transverse sulcus near posterior margin ending each side in a small foveæ, and with prominent tubercles overhanging the armature and the posterior margin lobed. Elytra about five times as long as prothorax, slightly broader behind, narrowly margined, and with disc rather coarsely, closely, and rugosely punctured, and finely, sparsely pilose. Beneath uniformly dull and finely rugose, the seventh ventral normally divided. Length 4.75 mm., breadth 1.75 mm.

Type, a unique male in the collection of the U. S. National Museum, secured in the Panamint Valley, Inyo Co., Cal., April, 1891, by Albert Koebele, marked Type, Cat. no. 21694, Panamint Valley (Koebele).

This species best belongs near *S. lutea* var. *filigera* Lec., but it is narrower and more delicate in every way, with the posterior margin of the prothorax lobed, not broadly rounded, the posterior angles almost rectangular and not conspicuous, the incisure a mere notch at the posterior angles, and the posterior process a very minute thread which only partially encloses the incisure. It is a most interesting product of the desert.

**Silis lutea** Lec.

*Silis lutea* Lec., Journ. Acad. Nat. Sc. Phila., 2d Ed., Vol. V (—), p. 333; Trans. Amer. Ent. Soc., Vol. V (1874), pp. 61 and 62; Trans. Amer. Ent. Soc., Vol. IX (1881), p. 57.

*Silis pallens* Lec., Proc. Acad. Nat. Sc. Phila., Vol. V (1851), p. 339.

var. *filigera* Lec., Trans. Amer. Ent. Soc., Vol. V (1874), p. 62; Trans. Amer. Ent. Soc., Vol. IV (1881), p. 57.

These two are simply color phases of one species as is the case with *pallida* and *maritima* and superficially they closely resemble them. Besides the entirely different type of prothoracic armature, *lutea* has in addition as a differentiating character from *pallida*, the elytra simply blackened apically, not margined with black as well. *Filigera* can best be separated from *maritima* aside from the arma-

ture, by its having the red area of the pronotum completely bisected. In the female, the spot is almost bisected. The more rugose elytra of *vulnerata* will generally enable that to be separated as will also the rugose elytra of *rugosa* that species. *Lutca* is found more or less widely distributed throughout western Oregon and the more western parts of northern and central California, while *filigera* is confined to a narrow coastal strip of land. Specimens have been taken at Santa Barbara, Cal., the type locality, Carmel Bay, Cal., Fieldbrook, Humboldt Co., Cal., and Tenino, Wash. Of the three coastal black forms, this therefore has the greatest distribution for *rugosa* only ranges from Marin to Mendocino Co., Cal., and *maritima* along the coast of Oregon. (Plate IX, fig. 8.)

***Silis spatulata* Lec.**

*Silis spatulata* Lec., Trans. Amer. Ent. Soc., Vol. IX (1881), p. 57.

This eastern black species resembles *percomis*, as I have stated before, but it appears to be much scarcer. It has been recorded from Illinois, the type locality, and Indiana (Blatchley), and I have seen specimens from Ithaca, N. Y., Plummers Is., Md., and Tryon, N. C. (Plate IX, fig. 9.)

***Silis deserticola* new species.**

Elongate, large, rather dull, slaty black with entire thorax orange. Head as broad as apex of prothorax, depressed between the eyes; eyes prominent, antennæ filiform and reaching three fourths length of body. Prothorax almost a semicircle in outline, one fourth broader at base than long, apex broadly rounded, sides in front almost straight and widely divergent backwards, the posterior incisure deep and broadly opening almost directly outwards, the anterior angle of the same acute, prominent, divergent, and with its posterior margin reflexed and cariniform, the posterior angles small and acute, the posterior process a blunt spine of moderate length projecting directly outwards from beneath the posterior angles, the base broadly lobed and including processes, of same breadth as base of elytra, the disc with deep foveæ just within the incisures and with distinct longitudinal sulcus at middle. Elytra about six times as long as prothorax, slightly wider posteriorly, moderately coarsely, closely punctured, somewhat scabrous, and with an evident though short white pubescence. Beneath shining in front and dull and rugose over abdomen. Length 7 mm., breadth 3 mm.

Type and paratype in the collection of the United State Museum, collected in the Argus Mountains, a desert range of southeastern California, May, 1891, by Albert Koebele and marked Type and Paratype, Cat. no. 21694, Argus Mts., Cal. (Koebele).

This species is one of the largest in our fauna, only exceeded in size by *spinigera* and equaled by *arizonica*. Like the latter, it has a prothorax which is very much broader at base than at apex, but has an armature of a different type. The prothoracic incisure is more nearly that of *difficilis* but the anterior angles of the incisure are strongly reflexed along their posterior margins, whereas that character is lacking in the latter, and the posterior process is broader and blunter. The general shape of *deserticola* is also different, very broad behind, and the basal foveæ are several times larger and the disc deeply sulcate as against one that is unimpressed.

**Silis arizonica** new species.

Elongate, large, moderately shining, black with an entirely orange prothorax. Head as broad as apex of prothorax, depressed between the eyes; eyes prominent; antennæ filiform and reaching fully three fourths length of body. Prothorax over one fourth broader at base than long and broader than base of elytra, apex broadly rounded, sides in front almost straight and widely diverging backwards, the posterior incisure a small fenestra bounded in front by a hook-like process, the extension of the anterior angles, and posteriorly by a broad and rounded process which extends directly outwards from beneath the moderately developed acute hind angles, this process having at its middle a crest that extends forward and almost meets the anterior process so as to partially close the incisure, the entire armature protruding outwardly from the posterior angles, well beyond the line of the lateral margin, the posterior margin narrowly lobed, and the disc with small deep foveæ just within the lateral armature but otherwise without any sculpturing of note. Elytra about 5.5 times as long as prothorax, wider posteriorly, coarsely, closely punctate, and scabrous, with short, fine, and sparse ashen pubescence. Beneath slightly shining in front and dull and rugose over abdomen. Length 7 mm., breadth 2.75 mm. (Plate IX, fig. 11.)

Type in my own collection, captured at Prescott, Ariz., August, 1910, by Mr. J. August Kusche. In the National Museum series of specimens are nine males and three females of the same species, all collected in May and June, at Williams, Ariz., by Barber and Schwarz. They are all somewhat smaller than the type, averaging but 6 mm. in length. The females are slightly broader than their mates, with finer and shorter antennæ, and with the prothorax quite transverse, almost twice as wide as long, the apex broadly rounded, sinuate just before the anterior angles, the angles themselves obliquely truncate, sides straight except just in front of posterior angles where slightly sinuate, the posterior angles nearly rectangular, and the posterior margin broadly lobed.

This species is somewhat suggestive of *deserticola*, particularly as regards the greater breadth of the prothorax posteriorly, but its armature is much like that seen in *fenestrata*. It is a species of the highlands of northern Arizona, a region where *S. difficilis* Lec. is also to be found.

**Silis fenestrata** new species.

Elongate, but slightly shining, black with disc of prothorax orange. Head as broad as apex of prothorax, depressed between the eyes; eyes moderately prominent and well separated; antennæ reaching over three fourths the length of body, quite filiform, the median joints not serrate; prothorax about one fourth broader than long, as broad as base of elytra, apex broadly rounded, sides in front almost straight, divergent posteriorly, the posterior incisure small and almost entirely closed, the acute anterior angle bounding it extending obliquely backwards, overlapping, and partially locking with the hook-like process of the posterior appendage, this latter projecting outwardly from the base itself, the outer part of the armature not extending beyond the normal lateral margin, the base lobed, the disc feebly convex with a poorly defined longitudinal impression and rather deep basal foveæ, and the anterior and posterior margins moderately reflexed. Elytra four and a half times as long as prothorax, widest one third distant from apex, the disc rather coarsely and closely punctured, somewhat rugose and dull, and rather finely, sparsely clothed with cinereous pile as usual. Beneath shining in front and dull rugose over abdomen. Length 5.5 mm., breadth 2 mm. (Plate IX, fig. 10.)

Type, a unique male in my collection, given to me by Mr. J. C. Bridwell, who captured it on Mt. San Jacinto, southern California, July, 1912.

It is a species which has its closest relative in *arizonica* but its non-protuberant armature will readily separate it from that.

**Silis nigerrima** Schaefer.

*Silis nigerrima* Schaefer., Journ. N. Y. Ent. Soc., Vol. XVI (1908), p. 66.

This species forms, with the three following, a group which while having the general facies, type of antennæ, and so forth, characteristic of the species which precede, yet shares with the succeeding three and more typical members of the subgenus *Ditelmus* their most important features, and thus serves as a connecting link between the two groups. It is entirely black and the most distinctly characterized of the three all black forms found within our territory. So far, it has only been found in the mountains of southern Arizona, such as the Huachuca and at Camp Grant in the Pinaleno Mountains. (Plate IX, fig. 12.)

**Silis abdominalis** Schaeff.

*Silis abdominalis* Schaeff., Journ. N. Y. Ent. Soc., Vol. XVI (1908), p. 66.

The color, the less protuberant armature, smaller posterior lobe, and shorter antennæ, will readily separate this species from the preceding. It was described as from the Huachuca Mountains, but has also been taken in the Chiricahua Mountains, also in southern Arizona. (Plate IX, fig. 13.)

**Silis perforata** Lec.

*Silis perforata* Lec., Trans. Am. Ent. Soc., Vol. IX (1881), p. 57.

This species is very closely related to *abdominalis*, but is generally more elongate, grayer, more coarsely pilose, with only the front of head, prothorax, and abdomen yellow, whereas the other has the base of the antennæ and basal portion of legs also similarly colored, the prothorax proportionally broader, the anterior lobe of the armature longer and more distinctly truncate apically, the posterior lobe more posterior, longer, broader, and more lamellate, extending outwardly well beneath the apex of the anterior so that a definite fenestra appears when the view is from above, the basal foveæ distinct though small in contrast to the other where they merge with the basal sulcus. The female has the prothorax transverse, completely and broadly margined, with the apical margin broadly arcuate, the basal more distinctly arcuate, the sides slightly sinuate, and the hind angles small and obtuse. The antennæ are also shorter than in the male, as usual, extending barely to the middle of the body in contrast to the male where they extend fully three fourths the length of the body. The species seems to be limited to Texas, specimens before me being from San Antonio, Corpus Cristi, and San Diego.

**Silis fossiger** Lec.

*Ditemnus fossiger* Lec., Trans. Am. Ent. Soc., Vol. IX (1881), p. 58.

This very pretty species, the only definitely vittate one in our fauna, has in common with the following, the deep median pit in the male pronotum and similar type of armature but it differs in detail by having the anterior lobe not produced backwards, by the posterior process being distinctly separated from it and by extending backwards as a narrow parallel-sided process with a deep emargination at apex. The process also is distinctly separated from the posterior



angles as in *nigerrima*. The males have the elytra laterally margined with yellow. The prothorax of the female is almost squarely truncate in front, broadly rounded posteriorly, and with sides almost straight but divergent to the obliquely truncated hind angles, the elytra distinctly rugose whereas they are not so in the males, and with both lateral and sutural margins yellow. It is found in Texas, specimens from Dimmit Co. and Brownsville having been seen. The Mexican, *S. dilacerata* Gorb. is its closest relative and is in fact but a mere variety of this as comparison with an authoritatively determined specimen has shown. The latter has only the black median longitudinal pronotal stripe to separate it. In the LeConte collection the specimen bearing the label is undoubtedly not the type. In fact it is not *fossiger* at all but the following, *tricornis*. The type from Texas is probably in the Horn collection. LeConte retained an Arizona specimen for his collection but did not carefully compare it with the Texas type.<sup>1</sup>

***Silis tricornis* new species.**

Small, short, but slightly shining, black with prothorax orange, slightly maculated in front and behind with black. Head as broad as apex of prothorax and depressed between the eyes. Prothorax about one third broader than long, apex straight and not reflexed, sides diverging from apex for anterior third, then merging with the lateral armature which consists of a broad horn-like process extending backwards from in front of the middle and a broad plate extending outwardly from behind it terminating in an anterior tooth and a posterior spine, the opening between the two processes narrow, the basal angles small, very acute, and somewhat posterior to the armature, the base truncately lobed, the disc with a broad, deep fossa at middle, and transverse sulcus close to basal margin. Elytra slightly more than four times length of prothorax, somewhat wider posteriorly, broadly rounded apically, distinctly margined, the disc scabrous and with a sparse yellowish pile. Beneath opaque and finely rugose. Length 3.75 mm., breadth 1.5 mm.

Type, a unique in the National Museum collection, taken at Hot Springs, forty-five miles north-northwest of Phoenix, Ariz., June 22, by Barber and Schwarz, and marked Type, Cat. no. 21696, Hot Springs, Ariz. (Schwarz and Barber). The specimen is somewhat mutilated, the antennæ having been lost. A second specimen is in the LeConte collection, labeled as *fossiger*.

<sup>1</sup> Upon examining the Horn Collection, I find that my surmise is correct. The Texas specimen upon which the description is based is there. It is therefore the true type. With it are five other specimens, all from Arizona, and all like the LeConte specimen.

The peculiar armature of this insect makes it very distinct but the deeply pitted pronotum shows its relationship to the preceding. In the characteristics of the posterior lobe it shows an approach to the Mexican *S. biauriculata* Champ., but it has a much simpler type of anterior lobe than has the species from farther south. The unicolorous elytra also separates it. (Plate IX, fig. 2.)

**Silis bidentata** Say.

*Cantharis? bidentata* Say., Journ. Acad. Nat. Sci. Phila., Vol. V, p. 169; Ed. Lec., Vol. II, p. 278.

*Silis lepida* Dej., Cat., 3d Ed., p. 121.

*Silis bidentata* Say, Proc. Acad. Nat. Sc. Phila., Vol. V (1851), p. 339.

*Ditemnus bidentatus* Lec., Class. Col. N. Am., Smith. Mis. Coll., Vol. III (1861-62), p. 189; Trans. Amer. Ent. Soc., Vol. IX (1881), p. 58.

This common Eastern species seems to be distributed throughout the Middle and South Atlantic States and along the western flanks of the Alleghany Mountains, but from Indiana west to the Rockies it appears to be replaced to a great extent by the following. It is also fairly constant though the color of the head is apt to be red in the northern specimens and piceous in the southern specimens. (Plate IX, fig. 14.)

**Silis latiloba** Blatch.

*Ditemnus latilobus* Blatch Col., Indiana, p. 837.

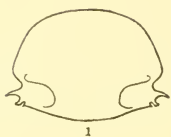
This differs from the preceding mainly in being larger, in having the head uniformly piceous, the posterior lobe of the lateral thoracic armature more than twice the width of the lobe in front and with its outer margin obliquely truncate, and the lateral extension of the apical margin less lobe-like. It was described from Indiana but specimens have also been seen from Minnesota, Iowa, Nebraska, and Missouri. It seems to be rather common in Missouri.

**Silis obtusa** Lec.

*Ditemnus obtusus* Lec., Trans. Am. Ent. Soc., Vol. V (1874), p. 62.

The prothorax broadly bordered with black, the entire absence of lateral lobing to the anterior margin, the broader anterior lobe of the armature and its projection backwards, the smaller and more hook-like posterior lobe, and the deep and rounded median fossa, distinctly separates this species from either of the preceding two. It is found in both middle and southern California, but is more common in the latter region. (Plate IX, fig. 15.)





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E. C. V. D.

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Silis.

EXPLANATION OF PLATE IX.

Outline, slightly diagrammatic, drawings of male prothorax of the species of *Silis* in America, north of Mexico.

- Fig. 1. *Silis spinigera* Lec.
- Fig. 2. *Silis iricornis* n. sp.
- Fig. 3. *Silis difficilis* Lec.
- Fig. 4. *Silis cava* Lec.
- Fig. 5. *Silis rugosa* n. sp.
- Fig. 6. *Silis percomis* Say.
- Fig. 7. *Silis pallida* Mann.
- Fig. 8. *Silis lutea* Lec.
- Fig. 9. *Silis spatulata* Lec.
- Fig. 10. *Silis fenestrata* n. sp.
- Fig. 11. *Silis arizonica* n. sp.
- Fig. 12. *Silis nigerrima* Schaef.
- Fig. 13. *Silis abdominalis* Schaef.
- Fig. 14. *Silis bidentata* Say.
- Fig. 15. *Silis obtusa* Lec.



# A NEW GENUS AND SPECIES OF CAVE-DWELLING CARABIDÆ (COLEOPTERA) FROM THE UNITED STATES.

BY EDWIN C. VAN DYKE.

BERKELEY, CAL.

While working over the collection of Coleoptera belonging to the department of entomology, Cornell University, this last year, I found among the unassigned material, a very peculiar Carabid which I immediately recognized as something entirely new. This through the courtesy of the department and the discoverer I am permitted to describe. The beetle was kindly figured for me by Mr. C. H. Kennedy.

*Comstockia*, new genus.

Elongate, slender. Antennæ slender, very long, three basal joints glabrous, first joint stout, second narrow and but two thirds length of first, third three times length of second, fourth to eleventh gradually shorter and fifth to eleventh increasingly stouter. Head elongate elliptical, much prolonged posteriorly and narrowed to a distinct

neck with posterior part a semiglobular condyle; front with two supraorbital setigerous punctures, the posterior with distinct setæ, the anterior faint and without setæ; clypeus moderately prolonged and with setigerous punctures each side; labrum transverse, feebly emarginate, margin sexsetose. Eyes absolutely wanting. Mandibles moderately prominent, prognathous, arcuately acute at tip, and without setigerous puncture in scrobe. Maxillæ slender, ciliate and spinose within, the outer lobe slender and with two equal joints, the palpi slender and long, joints two and three about equal in length, the terminal one three fourths length of third, fusiform, and somewhat robust. Submentum moderately deeply emarginate and with blunt tooth at center; the ligula slender, rounded at apex and bisetose; the

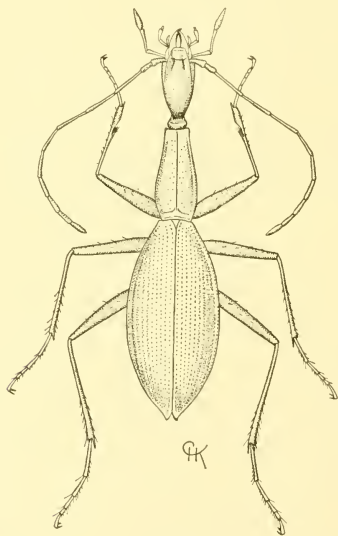


FIG. 1.

palpi slender, last joint oval and acute, the penultimate bisetose in front. Thorax elongate, a bit wider at widest part than head, margin distinct, sides without setæ but with very vague signs of numerous

punctures. Body subpedunculate, scutellum acutely triangular and prolonged between the elytra. Elytra elliptical, not margined at base, lateral margin distinct and entire, without internal plica, apices without sinuation, acute and divergent, disc striate, without evident dorsal punctures. Prosternum carinate in front and slightly prolonged at tip. Mesosternum oblique, the epimera narrow. Metasternal epimera distinct, posterior coxæ supposedly contiguous (specimen somewhat injured at this point). Legs very long and slender; middle and posterior tibiæ slightly ciliate externally, the anterior deeply emarginate one fourth distance from apex, the apical spurs distinct and slender; the tarsi slender, all joints long, slender and simple, the first longer than the two following together, the claws simple.

Genotype: *Comstockia subterranea* n. sp.

This genus is founded upon a peculiar cave-dwelling beetle of the family Carabidæ. Judged by its major characters, it would fall in the tribe *Ctenodactylini* as defined by Horn,<sup>1</sup> but it differs materially from any of the known genera included within that. In general, it has the elongated head of one of the more highly specialized species of *Anophthalmus* like *A. tellkampfi* Er., a cave beetle belonging to another and quite widely separated tribe; a prothorax which simulates in outline that of an *Agra*, a genus of arboreal beetles which show a decided affinity with the *Ctenodactylini*; and elytra which are very similar to certain members of the genus *Platynus*, especially *P. myrmecodes* Horn. It shows in a high degree its adaptation to a cave life as indicated by its bleached-out appearance, its lack of eyes, its extremely long and slightly clubbed antennæ, and very long and delicate legs. It is also interesting as being the first typical cave beetle from North America that shows relationships with genera of southern rather than of northern origin, as indicated by having affinities with *Casnonia* and *Agra*, characteristic genera of South America.

The generic name is given in honor of its discoverer, Professor J. H. Comstock, a man who has contributed so much to the advancement of American entomology.

<sup>1</sup>"On the Genera of Carabidæ with special reference to the fauna of Boreal America," by George H. Horn, M.D., Trans. Am. Ent. Soc., Vol. IX (1881-82), pp. 145-146.

**C. subterranea** new species.

Pale rufo-testaceous, head and thorax shining. Elytra dull. Head elliptical excluding the globular basal part, about three times as long as broad and three fourths as broad as prothorax, broadly and shallowly grooved at sides of front and with a few fine striæ within the grooves and posterior to the same; the antennæ fully three fourths length of body and with outer joints somewhat enlarged. Prothorax about three times as long as broad, base slightly emarginate. Apex truncate and three fourths width of base, the sides gradually divergent and almost straight from apex to beyond middle where they become slightly arcuate and then gradually sinuate to base, the lateral margin finely but distinctly and acutely defined, more evident basally, the disc smooth and but slightly convex, the median longitudinal line fine and extending from base to close to apex, the anterior and basal transverse lines vaguely defined. Elytra elliptical, over twice as long as broad and two and a half times as broad as thorax, apices of each elytron obtusely pointed and divergent, the lateral margin clearly defined and slightly reflexed, the disc barely convex and with striæ fine and complete, the surface minutely alutaceous. Body beneath dull. Length 8.5 mm., breadth 2 mm.

Type, a unique female captured March 12-18, 1903, in a cave near Austin, Texas, by Professor J. H. Comstock. The specimen is now deposited in the collection of the entomological department of Cornell University at Ithaca, N. Y.

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**BOREAPHILUS, A GENUS OF STAPHYLINID  
COLEOPTERA NEW TO NORTH AMERICA.**

BY HOWARD NOTMAN,

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The genus *Boreaphilus* was first described by Sahlberg. (Ins. Fenn. I, 433, 1.) It has not been possible to consult this description. It is stated by Lacordaire, however, that Erichson's description is a repetition of the original. (Erich. Gen. et Sp. Staph., p. 899; Lac. Gen. des Col., II, p. 138.) It is as follows:

"Palpi anteriores 4-articulati, articulo tertio clavato, ultimo parvo, subulato, posteriores minuti, filiformes. Mandibula elongata, tenuis, falcata, integra. Antennæ subfiliformes, extrorsum paulo crassiores. Corpus postice dilatatum. Caput orbiculatum, subexsertum. Thorax oblongus."



The type species is *B. henningianus* Sahlb. (Erichs., *l. c.*; Kraatz, Berl. Ent. Zeits., I, 1857, p. 41.)

The genus was enlarged by Lacordaire to include *Coryphium* Steph. (Steph. Ill. Brit. Ent., V, p. 344; Lac., *l. c.*, p. 137)—a change suggested by Erichson (*l. c.*, p. 900). Neither of these authors had seen specimens of *Coryphium* (*angusticolle*, Steph.), nor are specimens now at hand. A good figure, however, is given in a paper by Dr. Kraatz (Berl. Ent. Zeit., I, 1857, taf. I), where it may be seen that *Coryphium* differs much in form from *Boreaphilus* but bears a strong resemblance to *Eudectus*, differing from the latter in the less sharply angulate sides of the thorax. The thorax of *Coryphium* is obcordate (Steph., *l. c.*; Muls. et Rey, Soc. Linn. Lyon, p. 392); that of *Boreaphilus* is oblong and subangulate a little before the middle. A difference in the antennæ is also given; in *Coryphium* scarcely thicker towards the extremity with the first two joints scarcely incrassate; in *Boreaphilus* distinctly thicker towards the extremity with the first joint strongly incrassate, the second a little less so. (Muls. et Rey, *l. c.*) However, this thickening of the outer joints of the antennæ is more apparent in *B. velox* than in *B. henningianus*, which is not included in the work of Mulsant and Rey here cited. *Coryphium* is placed as a distinct genus in the Catalogus of Gemminger and Harold (II, p. 664), and in subsequent authors.

These genera, *Boreaphilus*, *Coryphium*, *Eudectus* and the genera *Niphetodes* and *Ephelinus* (*Ephelis*) are placed together in a well-marked group of the Omaliini, differing by the strongly incrassate and truncate third joint of the maxillary palpi and the small subulate fourth joint.

Another genus now regarded as a synonym of *Boreaphilus* deserves mention—*Chevricria* was described by Heer. (Fn. Helv., I, 1838-1842, p. 188.) It has been impossible to consult this description, but the genus is said to have been separated from *Boreaphilus* by a character—the presence of a strong tooth on the mandibles (Kr., *l. c.*, p. 36), since found to be also present in *Boreaphilus*. The type species, *B. velox* Heer, differs from the other Boreaphili in the presence of fully developed wings, which seems to have escaped notice, for none of the authors consulted, with one exception mention the fact that the under wings in *B. henningianus* are almost entirely aborted and unsuited for flight; the exception being the description

by Haliday of *B. henningianus* in the Entomologist, Vol. I, p. 187, as follows: "Bor. henningianus. *Apterus*, thorace oblongo capite angustiore et elytris thorace parum longioribus fortiter punctatis."

*Niphetodes* was described by Miller (Verh. zööl.-bot. Ges. Wien, XVIII, 1868, p. 16), and made a subgenus of *Boreaphilus* by Ganglbauer. (Kaf. v. Mittleu., II, p. 700.) The genus was subsequently recognized as valid by Ganglbauer. (Ann. Nat. Hofmus. Wien, II, 1896, p. 174.) The species placed in this genus are said to be wingless; a fact which has not been verified from lack of material. It has been ascertained that in *Niphetodes debeli* Gangl. the elytra are solidly anchylosed, which is not the case in *B. henningianus*.

Miller's description of *Niphetodes* is as follows:

"Mandibulæ tenues, falcatæ, medio dente longiore armatæ.

"Maxillæ malis elongatus, mala interiore intus apice ciliata.

"Palpi maxillares articulo tertio tumido, quarto minimo, subulato.

"Palpi labiales articulo primo secundo duplo longiore.

"Prothorax lateribus rotundatus.

"Elytra prothoracis longitudine; alæ desunt.

"Tibiæ muticæ, tarsi articulis quatuor primis longitudine subæqualibus."

To which may be added, as Ganglbauer states, that the ocelli are lacking, a fact which distinguishes the species from the rest of the Omaliini.

An examination of specimens of *N. debeli* Gangl. and *N. eppelsheimi* Gangl. shows that the thorax of *debeli* is like that of *Boreaphilus henningianus*, and that of *eppelsheimi* is like that of *Coryphium angusticolle*, being more or less cordate. It is, however, slightly narrower than the head. *B. debeli* is placed in a subgenus *Hypsonothrus* by Ganglbauer.

The genus *Ephelinus* Cock (*Ephelis* Fauv.) is of interest as containing three species described by LeConte, placed originally by him in *Coryphium*. (Lec. New Sp. Col., I, 1863, p. 57.) The only structural character given by him is that of the shape of the thorax, thus: (1) *pallidum*, "thorace latitudine haud brevior, postice parum angustato lateribus serrulatis." (2) *guttatum*, "thorace latitudine haud brevior, postice modice angustato, lateribus obsolete serrulatis, callo dorsali pone medium laevi." (3) *notatum*, "thorace latitudine haud brevior, postice paulo angustato, lateribus serrulatis, callo postico dorsali."

The species were later placed in a new genus, *Ephelis*, by Fauvel, who redescribed two of the species, *guttata* and *notata*, from specimens in his possession. He distinguishes them thus:

- a. Corselet subcordiforme, non transverse, nettement dilaté au 1er tiers antérieur ..... *guttata*  
 b. Corselet subquadrangulaire, légèrement transverse, à peine élargi au 1er quart antérieur ..... *notata*

He comments on the genus thus: "Ce genre me paraît bien distinct des *Coryphium* et des genres voisins par la forme des palpes maxillaires et surtout la structure de ses tarses antérieurs et postérieurs. Son facies est aussi très différent et spécial." The palpi of *Ephelis* are described thus: "Palpi maxillares articulo penultimo apice truncato, ultimo brevissimo, minus gracili, vix conspicuo." According to Leconte the first joint of the posterior tarsi is slightly longer. (Lec. Horn, Class. Col., p. 104.) The genus is changed to *Ephelinus* Cock. in the latest catalogue for nomenclatural reasons. (Coleopterorum Catalogus, Pars 19, p. 83.)

The description of the head and thorax given by Stephens and Mulsant and Rey for *Coryphium* and Fauvel for *Ephelis* are as follows: Stephens—"head triangular, unequal above; thorax not so wide as the head, obcordate, with the sides somewhat margined"; Mulsant and Rey—"Tête grande, proéminente, subtriangulaire, environ de la largeur du prothorax, bifovéolée en avant, subchancrée et fortement resserrée à la base, portée sur un col très court mais bien tranché, aussi large ou à peine plus large que la moitié du vertex"; Fauvel—"Caput basi non constrictum, insertum, linea basali transversali nulla"; and in the redescription of *guttata* Lec.—"thorace paulo longiore quam latiore, latitudine maxima capite paulo latiore." From these descriptions it would seem that in LeConte's three species the head is as wide as the thorax or slightly narrower and that the thorax is not or less strongly transverse than in *Coryphium*.

It is worth noting that the description of *Coryphium* given by Ganglbauer (Käfer, Mittl., II, p. 701) is not in accord with the original description in Stephens or the later one in Mulsant and Rey. "Halsschild quer, breiter als der Kopf und viel breiter als lang, vor der Mitte gerundet erweitert, mässig gewölbt, mit sehr schmall aber deutlich gekehlt abgesetztem, fein gekerbttem Seitenrand."

Four specimens labelled *Boreaphilus henningianus* Sahl. have been

examined. Three of these are alike in every respect and are taken to be the type species. One of two specimens in the collection of the American Museum of Natural History is different and is identified as *B. sahlbergi* Popp. That species is distinguished as follows: "Sehr nahe verwandt mit *B. henningianus* Sahlb. unterscheidet sich aber durch schmälere Kopf, der spärlicher punktiert ist, besonders aber durch den bedeutend schmälere und etwas längere Halsschild, der nach hinten etwas stärker verengt ist. Die Flügeldecken sind etwas länger, viel weitläufiger und etwas feiner punktiert und stärker glänzend." The two American specimens at hand most closely resemble this specimen, which carries the pin label "Fennia. Reitter." They differ in having smaller heads, shorter and more strongly dilated elytra with less prominent shoulders and the elytral punctures are coarser and less closely placed. They differ in these respects from *B. henningianus* and also in the thorax more strongly narrowed behind. In one of the specimens the ocelli are very indistinct.

OMALIINI.

**Boreaphilus, Sahlb.**

Body subelongate or oblong, scarcely convex, pubescent, alate or apterus.

Head large, prominent, suborbicular, larger than the thorax, bifoveolate in front, subemarginate and very strongly constricted at the base with a short, rather narrow neck, one half the width of the head at the vertex or scarcely narrower. Ocelli very distinct, distant, more or less behind the posterior margin of the eyes. Tempora mutic at the sides, genae rather strongly mammillate beneath, gula strongly impressed. Epistoma convex, front broadly and feebly biimpressed between the eyes, truncate and obsoletely margined in front. Labrum very short, broadly truncate at apex. Mandibles elongate, slender, very acute, strongly falcate, unidentate internally. Maxillary palpi strongly developed, first joint small, second elongate, subarcuate, subclavate, third large strongly incrassate, pyriform, truncate at apex, the last minute, subulate. Labial palpi small, three-jointed, the last slender, the first stouter, subequal in length, slightly larger at apex. Mentum large, transverse, truncate or scarcely sinuate at apex, anterior angles visibly projecting. Eyes moderate or rather small, semiglobular, projecting, more or less distant from the

neck. Antennæ short, more or less robust, almost straight, distinctly thickened externally, first joint strongly incrassate, very shortly oval, second slightly less incrassate, stouter than the third, the latter obconic or elongate conic, the following submoniliform, the outer joints more or less transverse, the last very shortly oval.

Prothorax oblong or suboblong, subattenuate in front, slightly rounded at apex, truncate at base, subangulate-dilate on the sides before the middle, scarcely narrowed or somewhat narrowed behind, very much narrower than the elytra, very finely margined at base and on the sides. Epipleuræ large, visible at the sides, rather narrow in front, dilated and rounded behind.

Scutellum rather small, subogival.

Elytra rather large, suboblong, a little longer than the breast, longer than the thorax, truncate at apex, broadly rounded at the postero-external angles, subrectilinear and distinctly margined at the sides, more finely at apex. Epipleuræ rather strongly inflexed, subarcuate, acute posteriorly. Shoulders prominent.

Prosternum rather strongly developed before the anterior coxæ, angulate. and submucronate posteriorly. Mesosternum moderate, subacute behind, the prolongation hardly reaching the middle of the intermediate coxæ. Mesepisternum rather large, separated from the mesosternum by an obsolete margin. Mesepimera moderate, oblong, oblique. Metasternum rather large, not sinuate at the insertion of the posterior coxæ, feebly angulate between them, angulate between the intermediate coxæ and linearly prolonged to the point of the mesosternum. Metepisternum acutely elongate. Metepimera concealed.

Abdomen rather short, shorter than the elytra, large, subacuminate posteriorly, side margins broad and elevated, more or less covered at base, segments subequal, the sixth rather well developed, the armature ( $\delta^1$ ) sometimes apparent. The sixth ventral rather well developed, the seventh sometimes very distinct.

Anterior coxæ moderate, shorter than the femora, projecting, conic, subcontiguous. The intermediate almost as large, scarcely projecting, conic-suboval, slightly distant. The posterior rather large, subcontiguous within, upper lamella transverse, narrow exteriorly, suddenly dilated interiorly, lower lamella rather narrow subvertical.

Feet moderate. Anterior and intermediate trochanters small, sub-

cuneiform, the posterior slightly larger, subelongate. Femora subcompressed, rather narrow, scarcely enlarged at middle. Tibiæ slender at base, scarcely larger at apex, very finely ciliate, mutic, armed with two very small and indistinct spurs. Tarsi ciliate beneath, last joint clavate, subequal to the three preceding united. First four joints rather short, subequal. Claws small, slender, arcuate.

**B. americanus** new species.

Subelongate, dilated posteriorly, pubescence moderately long, somewhat coarse, rising from the punctures. Color dark piceo-ferruginous, abdomen darker, legs, antennæ, mouth, palpi and indefinite spots on head, thorax and elytra paler. Head, thorax and sterna strongly coarsely and somewhat sparsely punctured, interspaces smooth, shining, anterior margin of the clypeus, a median area near the posterior margin of the thorax and inner edge of the genæ beneath impunctured. Elytra more coarsely and sparsely punctured, deeply longitudinally impressed on the disk. Abdomen finely, sparsely

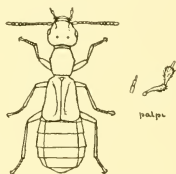


FIG. 1.

and indistinctly punctured above, finely, sparsely, indistinctly and subasperately punctured beneath.

Head suborbicular, subemarginate posteriorly, subequal in length to the thorax and somewhat wider.

Elytra about as wide as long, strongly narrowed anteriorly, at base about as wide as the head.

Abdomen one fourth longer and wider than the elytra.

Head broadly transversely impressed in front of the eyes, with two small and rather deep fossæ equidistant from each other and the eyes, clypeus broad, truncate at apex, labrum very broad and short with a row of short setæ along the anterior margin, mandibles long, slender, falcate. Mentum rather short, broadly and shallowly emarginate and perceptibly bisinuate. Labial palpi three jointed, terminal joint slender, first two joints subequal in length, stouter and slightly longer than the terminal, both slightly broader at apex. Maxillary palpi much longer, first joint small, second elongate, arcuate-sinuate and incrassate at apex, third very strongly and evenly incrassate from base to apex which is transversely truncate, last joint small, slender, subulate,

second and third joints pubescent. Genæ beneath very convex or mamillate, the gula strongly impressed slightly narrowed in front and behind. Eyes rather small, strongly projecting, coarsely faceted and pubescent. Antennæ equal in length to the head and thorax united, somewhat slender, gradually thickened, first joint large, oval, incrassate, second slightly shorter and less incrassate, third more slender, elongate-conic, four to seven subglobular, eight wider and slightly transverse, nine and ten quadrate as wide as eight and eleven, eleven longer than wide, apex acutely rounded.

Prothorax longer than wide, subcylindric, posterior margin slightly wider than the anterior, sides subangulate, slightly compressed in front and indistinctly toothed a little in front of the middle, side margin much depressed, descending to the angulation from the anterior and posterior margins, an indistinct impression on the median line before the middle.

Scutellum somewhat large, acutely triangular, with a few coarse punctures.

Elytra with the shoulders rounded, not very prominent, posterior-external angles widely rounded, posterior margin slightly retracted at the suture.

Tibiae and tarsi pubescent and ciliate, the first four joints of the posterior tarsi subequal, fifth joint equal in length to the three preceding. Length 2.75 mm., breadth 1 mm.

Type ♀ in the collection of the author, paratype ♀ in the collection of Mr. C. W. Leng.

Collected at Roselle Park, Union Co., N. J., by Mr. C. W. Leng.

The species of *Boreaphilus* are found in leaves and moss in damp localities. The American specimens were found with *Stenus*.

Eight species of *Boreaphilus* are listed in the Coleopterorum Catalogus of Junk and Schenkling (Pars 19, 1910, p. 84), of these *henningianus*, *sahlbergi* and *velox* have been mentioned; *astur* Sharp from Asturia is probably allied to *velox*, having rather short and stout antennæ (An. Soc. Esp., I, 1872, p. 266); *carinthiacus* Gangl. is a winged form also allied to *velox* (Gangl. Kaf. Mitteleur., II, 1895, p. 700); *japonicus* Sharp from Japan resembles *henningianus*, but has a smaller head and longer elytra, the latter would distinguish it from *americanus*; *lewisianus* Sharp, also from Japan, is distinguished from *henningianus* by its broader thorax and longer antennal joints—all the joints being longer than broad (Trans. Ent. Soc. Lond., 1874, p. 96). The description of *nordenskiöldi* Mäkl. (Oefv. Finsk. Vet. Soc. Forh., XIX, 1876-77, p. 25) could not be consulted. *B. volans* J. Sahlb., described after the publication of the Coleopterorum Catalogus, Pars 19, is a winged species resembling *velox*, but having more slender antennæ (Medd. Soc. Fauna. Fenn., 37, p. 47, Nov., 1910). These species are from Eastern Siberia and Finland respectively.

## ON SOME GENERA AND SPECIES OF THE FAMILY OSTOMIDÆ.

BY CHAS. SCHAEFFER,

BROOKLYN, N. Y.

At the request of Mr. Chas. Leng I prepared a list of the genera and species of this neglected family for his new checklist of Coleoptera. In this a new genus, several new species and some synonymy were included which have never been published. Therefore it was thought advisable to publish this short paper in advance of a revision of the family which I hope to publish in the near future.

Two tribes occur in our fauna, two more, the Nemosomini or Nemosomatinae and Leperini or Leperininae, are recognized by Reitter, Sharp and Léveillé, but the characters given are rather vague.

- Inner lobe of maxillæ very short, much shorter than the outer lobe and without hook at apex. Head large, as wide, or nearly as wide as the prothorax at apex; eyes not prominent. Elytra with narrow side-margin and narrow epipleuræ. Form more or less elongate.....**Tenebroidini**
- Inner lobe of maxillæ as long or nearly as long as the outer lobe, terminating at apex into a sharp, curved, hook-like process. Head small about half as wide as the prothorax at apex; eyes prominent. Elytra with lateral margin more or less explanate; epipleuræ wide. Form oval or elliptical .....**Ostomini**

## Tribe TENEBROIDINI.

1. Anterior margin of prosternum separated from the anterior margin of pronotum by the more or less projecting apical angles.....7  
Anterior margin of prosternum not interrupted at sides by projecting apical angles but continuous with the anterior margin of pronotum..2
2. Head with a rather deeply and longitudinally impressed line at middle; apex emarginate, each side of the emargination produced into a sub-acute lobe; mandibles deflexed; antennal club bilaterally dilated....3  
Head without impressed longitudinal line at middle; apex more or less trisinuate; mandibles porrect; antennal club dilated only internally..4
3. Prosternum flat, not compressed between the coxæ; prothorax with distinctly raised lateral margin.....**Nemosoma** Latr.  
Prosternum compressed and narrow between the coxæ; prothorax without distinctly raised lateral margin.....**Cylidrella** Sharp
4. Elytra at base with a deep and more or less rounded, sub-humeral impression; last joint of antennal club elongate-oval and not wider



- than the tenth joint; head subtriangularly flattened from a little below occiput to apex and sometimes more or less distinctly excavated; metasternum normally convex.....5
- Elytra at base without deep subcircular subhumeral impression.....6
5. Last joint of labial palpi at apex narrower than the maximum thickness of the joint; last two ventral segments equal in length and much shorter than the preceding segments; punctuation of elytra serially arranged .....**Corticotomus** Sharp
- Last joint of labial palpi broad at apex, rectilinearly truncate and about as wide as at the middle, rather rapidly narrowed basally; ventral segments one to three gradually and evenly decreasing in length, the fourth subequal to the third, or even a little longer and the fifth much the shortest of all; elytral punctures irregularly arranged, not in series.....**Parafilumis** Casey
6. Last joint of antennal club subquadrate and wider than the tenth joint; head convex, obliquely declivous just before the apex; metasternum relatively strongly convex at middle, sides somewhat compressed and shallowly excavated for the reception of the middle femora.
- Stenodema** Schaeff.
7. All the tibiæ with distinct spines externally; antennæ short, extending backwards a little below the anterior angles.....**Airora** Reit.
- Middle and hind tibiæ not spinous externally; antennæ longer, extending backwards to about middle of prothorax.....8
8. Lateral margin of prothorax behind middle more or less angularly deflexed; basal marginal head of elytra entire; labium very deeply, triangularly emarginate.....**Temnochila** Westw.
- Lateral margin of prothorax straight, not angularly deflexed behind middle; basal marginal bead of elytra distinct near humeri but obliterated near scutellum; labium feebly emarginate at apex.

**Tenebroides** Pill. & M.

**Nemosoma schwarzi** new species.

Cylindrical, convex, black or piceous, antennæ, palpi, legs and abdomen paler, each elytron with a large, oblique yellowish basal spot not quite attaining sides nor suture and a slightly smaller subsutural spot of the same color behind middle. Head moderately coarsely punctate, punctures somewhat elongate and more closely placed near apex. Antennæ eleven-jointed. Prothorax rather feebly narrowed posteriorly; lateral margin feebly deflexed in front; apical angles obliterated, basal angles obtuse; surface moderately coarsely but not closely punctate. Elytra convex; sides parallel, surface confusedly punctate, punctures moderate. Prosternum moderately coarsely punctate, punctures more numerous and a little coarser at sides. Metasternum at sides coarsely punctate, punctures smaller at middle. Ventral segments of abdomen apparently impunctate. Length 3 mm.

Fort Yuma, Arizona, type in coll. Hubbard and Schwarz, U. S. Nat. Museum.

An easily known species by its decided elytral maculation. The elytra is also relatively shorter than in our other species. The antennæ are apparently eleven-jointed, which will put this species with *fissiceps* Fall and *punctatum* Van Dyke in the subgenus *Monesoma*. *N. attenuatum* Van Dyke which has ten-jointed antennæ belongs in the subgenus *Nemosoma* s. st.

***Cylidrella championi* Wickh.**

This species is described from Colorado but occurs also in Arizona.

***Corticotomus caviceps* Fall and *læviventris* Casey.**

After examining a large series from different localities including California, Arizona, New Mexico, Colorado, etc., I can't do otherwise than unite the two. The excavation of the head is very variable in the large series before me. In some it is very pronounced, in others less so and some of the specimens have no indication of it; these latter I take to be the females. Similar variations occur in *cylindricus* but not as strongly pronounced as in *caviceps*. The punctuation of elytra is also variable, in some specimens very faint in others relatively strong.

***Corticotomus depressus* new species.**

Elongate depressed, color uniformly brown or piceous, legs, antennæ and palpi paler.

Head flat in front, relatively coarsely punctate, punctures on the disk well separated but more closely placed at sides near the eyes. Prothorax about as long as wide; sides slightly arcuate; at apex not wider than the head; surface relatively very densely and coarsely punctate, the punctures mostly separated by less than their own diameter. Elytra very feebly arcuate at sides; punctures of the regular series coarse, close and deeply impressed but gradually finer towards apex; intervals narrow, more or less uniseriately punctate, punctures very distinct and moderately coarse. Underside coarsely punctate, punctures on prosternum moderately close, those on metasternum very dense and separated by less than their own diameter; punctures on ventral segments of abdomen moderately close. Length 4 mm.; width 1 mm.

Alabama (Loding, type); Pennsylvania (Horn collection, teste Liebeck); New Jersey (Liebeck); Lakehurst, N. J. (Engelhardt).

This species is more depressed and much more coarsely punctate

than any of our other species. In the type specimen the intervals are regularly uniseriately punctate; however, in some of the few specimens seen a few adventitious punctures are present, especially on the second interval. The scutellum is more visible in this than in the other species. As far as known it occurs only on pine.

**Corticotomus cylindricus** var. **texanus** new variety.

Form and size of *cylindricus* but color normally black or piceous and intervals more or less distinctly uniseriately punctate.

Brownsville, Texas.

The intervals in this variety are clearer and generally more sparsely and finely punctate than in typical *cylindricus*, though specimens of the latter occur which approach the var. *texanus* in this respect. The size is generally smaller and the form slightly narrower than in *cylindricus*.

**Stenodema** new genus.

Head as wide as the prothorax, subconvex, near apical margin obliquely depressed; frontal margin trisinate; eyes small, transversely oval, distant from the apical margin of prothorax; antennæ eleven-jointed, reaching backwards a little below the apical margin of prothorax, club three-jointed, ninth and tenth joints rather strongly serrate, last joint much larger than the tenth, nearly quadrate and with apex obliquely truncate; last joints of maxillary and labial palpi subconical; submentum trisinate. Prothorax convex, parallel sided; apical margin feebly arcuate; apical angles obliterated; basal angles rounded. Scutellum indistinct. Elytra as wide as the prothorax; sides parallel; surface punctured in irregular rows. Prosternum behind coxæ convex, arcuately declivous behind; metasternum convex and slightly compressed at sides. Tibiæ without spines on the outer margin; tarsi slightly longer than the tibiæ.

Type—*Stenodema hicoriae* n. sp.

**Stenodema hicoriae** new species.

Cylindrical, convex, shining, color uniformly castaneous; antennæ, palpi and legs slightly paler. Head convex obliquely declivous a little before apical margin; moderately not closely punctate, the declivous apical part rather coarsely striate. Prothorax apparently longer than wide, sides parallel, surface rather sparsely punctate. Elytra cylindrical, sides parallel; surface punctured in irregular rows, punctures moderately coarse, finer towards apex;

intervals smooth. Prosternum smooth at middle with only a few coarse punctures, at sides more closely punctate; metasternum at sides coarsely punctate, more sparsely at middle; abdominal segments moderately closely punctate except the last which is nearly smooth. Length 2 mm.

Tryon, North Carolina.

The type is in the National Museum Collection, marked 3192d Hopk. U. S. and was bred from *hicoria* by W. F. Fiske. Paratypes in the Forest Insect Collection.

This interesting minute new species has the cylindrical form of *Airora* but the form of the head and of the last joint of the antennal club separate it from this as well as from any other North American genus.

***Airora minuta* new species.**

Cylindrical, convex, shining, color pale castaneous. Head somewhat remotely but not coarsely punctate; shallowly transversely impressed below the occiput. Prothorax not wider than the head; sides parallel; apical margin truncate; apical angles feeble; basal angles distinct but obtuse; lateral margin angularly reflexed a little below apex; surface rather coarsely punctate at sides; punctures finer and more sparse at middle. Elytra as wide as the prothorax; sides parallel, broadly rounded at apex; surface somewhat transversely wrinkled with rows of moderate punctures, intervals scarcely punctate. Prosternum and metasternum feebly punctate; ventral segments of abdomen rather coarsely punctate; tibiae scarcely spinous. Length 3 mm.

Fort Yuma, Arizona.

Type, one specimen in coll. Hubbard and Schwarz, U. S. Nat. Museum, which bears the note "preying on *Hylocorus*."

Besides the small size this species differs from *aqualis* Reitt. and allies by having the apical angles of prothorax not produced, the lateral margin of prothorax angularly reflexed near apex and the elytral striae not impressed.

***Temnochila edentata* new species.**

Generally smaller than *yucca* Cr., front tibiae evenly convex and not margined on each side of upper edge and without toothlike projections on outer margin, otherwise as in *yucca*. Length 14-15 mm.

Prescott, Arizona.

Most of the specimens seen were collected by Dr. Kunze and distributed by Mr. Chas. Palm. They differ constantly from typical *yucca* by the characters given above. Specimens of the latter species

in the Leconte collection which I examined and in the collections of Dr. Horn and the American Entomological Society, kindly examined at my request by Mr. Chas. Liebeck, all have the anterior tibiæ margined and the outer margin with one or two teeth. They all came undoubtedly from the original lot collected by Crotch in the Mohave desert.

**Temnochila acuta** Lec.

This is a distinct species and not synonymous with *virescens* as given in our lists. The head is dull, the abdominal segments finely alutaceous, the sensitive spaces of the joints of the antennal club are larger than in any of our other species and the posterior margin of the prosternum in most of the specimens is more convex and apparently feebly produced at middle. The males have the ventral segments at sides with a rather finely and closely punctate area which extends almost to middle and with very few larger punctures intermixed.

This species occurs also in Mexico and was considered by Dr. Sharp in the "Biologia" to be Fabricius' *virescens*. While there is a possibility that *virescens* is wrongly identified it is also possible that Dr. Sharp's identification is wrong as he gives no tangible reason why this species should be the true *virescens* of Fabricius. Drury who sent the specimen to Fabricius, received his American insects either from North or South America as far as I know, but Dr. Sharp did not give any South American locality for his *virescens*. If the specimen sent to Fabricius came from North America it was collected on the Atlantic coast and could be nothing else than our common species which occurs from Long Island to Florida.

Fabricius gives America only as locality and his rather vague description might fit almost any metallic green species of *Temnochila*. However, the size he gives—"triplo major *L. caraboides*"—restricts it only to the larger species. I have seen a great number of specimens of our common species but all are not nearly three times as large as *Tenebroides mauritanica*, which is the same as Fabricius' *Lucanus caraboides*, except one specimen from Florida which is about 19 mm. long. The examination of the type would settle the matter, but unfortunately I was unable to locate it. Mr. Champion and Mr. Arrow wrote me that the type is not in the British Museum collection

nor is it in the old collection of Fabricius in Kiel as I was informed by Dr. Walther Horn.

Not being able to clear this point at present it is better to follow the determinations of Leconte, Reitter, Horn and others in calling our common Atlantic coast species *virescens*.

***Temnochila virescens* var. *chlorodia* Mann.**

The specimens from the Pacific coast, which are the *chlorodia* of Mannerheim, are certainly distinct enough to be listed as a variety of *virescens*. They differ from *virescens* by being shorter, stouter and more convex, apical angles of prothorax more prominent and acute, basal angles of prothorax less prominent and humeral angles of elytra more or less acute. *T. cyanea* Reitt. and *T. viridicyanea* Mann. are synonyms of this form.

The specimens from the Atlantic coast are always more elongate and more depressed and the humeral angles of elytra are never as acute as in those from the Pacific coast.

***Temnochila peninsularis* new species.**

Very near *acuta* Lec. in size, form and color but joints of antennal club relatively smaller with the sensitive spaces narrower than *acuta*. Length

Santa Rosa, Lower California (Beyer).

The three males before me are a little more robust than *acuta* and *area* and the head and abdominal segments are a little less alutaceous than *acuta* but these parts are not as shining as in *area*.

***Temnochila area* Lec.**

*Temnochila nyenta* Dow.

Leconte's specimen is described from San Francisco, Cal., but I have no doubt that this is a mistake. The species, as far as known occurs only in southern California and Arizona. The type of *area* is a male and has the same ventral characters as Dow's *nyenta*. In the majority of specimens the frontal impression of the head is faint or absent but specimens occur in which it is more or less distinct. This distinct species is also erroneously placed as a synonym of *virescens*, but is a larger species and the male has the ventral segments of abdomen as in *acuta*.

**Temnochila prosternalis** new species.

Elongate, subparallel; color of upper and under surface metallic green, blue or purple; antennæ and palpi piceous. Head shining, rather densely and relatively coarsely punctate especially in front; front with a deep, longitudinal median impression. Prothorax densely and rather coarsely punctate on the disk, less densely near lateral margin; anterior angles acute, slightly produced; lateral margin feebly rotundate-angulate slightly behind middle; basal angles obtuse, not prominent. Elytra with rather coarse deep and closely placed punctures; intervals with slightly smaller punctures. Prosternum with moderately large not densely placed punctures, behind the coxæ with a more or less distinct transverse impression. Metasternum punctured as the prosternum. Abdominal segments shining, with moderately large punctures; males with a very small area of finer punctures intermixed with larger punctures at sides of each segment. Length 10-11.25 mm.

Williams, Arizona. (Barber & Schwarz coll.)

The type is in the Nat. Museum collection, paratypes in the collections of the Museum of the Brooklyn Institute and in Prof. Wickham's collection.

This species looks very much like small specimens of *virescens* var. *chlorodia* but has a much more densely and relatively coarsely punctate head, prothorax and elytra and the prosternum behind the coxæ at apex more or less distinctly impressed.

It is apparently closely related to *fraudulenta* from Mexico and *planicollis* from Guatemala. The metallic green species in this genus differ much individually in color, sculpture, etc., and it is possible that these three species are all one.

**Temnochila obscura** Reitt.

This species does not occur in North America.

**Tenebroides crassicornis** Horn.

*Trogosita pleuralis* Horn.

This is not a variety of *mauritanica* but a distinct species. It is always smaller, relatively less elongate and the joints of the antennæ are shorter and more closely placed than in *mauritanica*. *T. pleuralis* Horn does not seem to differ except in coloration.

**Tenebroides soror** Duv.

*T. foveata* Blatch.

I have several specimens from Florida (Key Largo and Key West) which agree closely with the description of the West Indian *T. soror*. Blatchley's *foveata* is the same thing.

**Tenebroides arizonensis** new species.

Elongate, moderately depressed; color rufo-piceous, elytra with distinct brassy tint.

Head rather finely and sparsely punctate; eighth antennal joint oval. Prothorax transverse; anterior angles broad and rather moderately produced; lateral margin arcuate, moderately convergent posteriorly; basal angles obtuse, acute and very feebly produced; basal marginal head broadly interrupted at middle; surface somewhat coarsely punctate at sides, punctures a little smaller and less close at middle. Elytra oblong-oval; punctures of the regular series moderately large; punctures of the intervals very fine and mostly obliterated; surface with short, transverse or oblique impressions as in *rugosipennis*. Prosternum, metasternum and ventral segments sparsely and rather finely punctate. Length 5 mm.; width 2 mm.

## Arizona.

A single specimen, apparently a female, in the O. Dietz collection, which I had placed with *rugosipennis*. It is very close to that species in form, color and elytral sculpture but the prothorax is not as strongly arcuate at sides as in that species, the posterior angles are distinct and acute, the basal marginal head is broadly interrupted at middle, the under surface is shining with fine punctuation and the maxillary palpi are narrower and more elongate than in *rugosipennis*.

**Tenebroides americanus** ssp. *laticollis* Horn.

*T. laticollis* differs from typical *americanus* in the relatively larger head, shorter and more transverse prothorax, clearer elytral sculpture with the punctures of the intervals mostly always small and the punctuation of prothorax and underside generally finer. It is also smaller than *americanus*. It is almost entitled to specific standing but in the absence of a distinct, strong and independent character and the possession of the same unique, secondary male character and the antennæ with the sensitive spaces formed as in *americanus* I prefer to place it as a subspecies of the latter.

**Tenebroides sonorensis** Sharp.

*T. debilis* Fall.

Through the kindness of Mr. Arrow I received from the British Museum one of the three typical specimens from which Dr. Sharp described his *sonorensis* and from Mr. Fall a specimen of his *debilis* which enabled me to settle the synonymy without a doubt.

The shape of prothorax and punctuation in this, as in many of the other species differ considerably.



**Tenebroides semicylindricus** Horn.*Tenebroides subænea* Reit.*Tenebroides helophorus* Sharp.

Of the correctness of the proposed synonymy I have scarcely a doubt. Dr. Sharp's good description of the Mexican *T. helophorus* agrees with our insect perfectly and Reitter's description of *T. subænea*, as far as it goes, does not fit any other North American species except *semicylindricus*.

**Tenebroides floridanus** new species.

Elongate, moderately depressed; color piceous; prothorax dull with feeble æneous tint; elytra shining and more distinctly æneous. Head moderately closely punctate, punctures not very large; eighth antennal joint oval. Prothorax transverse; apical angles moderately produced; lateral margin arcuate, feebly convergent behind, not sinuate before the basal angles; basal angles small, obtuse and subacute; basal marginal bead entire; surface moderately coarsely punctate at sides, punctures smaller at middle. Elytra slightly dilated below middle; punctures of the regular rows rather fine but moderately coarse near base. Prosternum rather finely punctate in front more coarsely punctate posteriorly and at sides. Metasternum finely punctate at middle, moderately coarsely and sparsely at sides. Ventral segments of abdomen moderately closely punctate, punctures finer posteriorly. First ventral segment of the male moderately densely and finely punctate and with a few larger punctures intermixed; second and following segments as in the female. Length 5-6 mm.

Florida. Key West, U. S. Nat. Mus. type.

This species resembles in form *T. americanus* ssp. *laticollis* but has a slightly longer prothorax, the basal marginal bead is generally entire and the male has only the first ventral segment densely punctured.

**Tenebroides marginatus** Pal. Beauv.*Tragosita cucujiformis* Horn.

Palisot de Beauvois' species can not be identified with certainty from his poor descriptions and figures. However, one of his species, *marginatus*, is recognized in our list and if correctly so Dr. Horn's *cucujiformis* is a synonym of this species. The latter species was described from an immature specimen. The form of prothorax as well as the punctuation of the upper surface is very variable in this as well as in the other species of this genus.

*Tenebroides opaca* Reit. Verd. Nat. Ver. Brünn XIII, 1875, p. 69.

The localities given by Reitter for this species are "Columbia et Amer. bor." The male has on each side of the submentum a fulvous hair-pencil, a character which is found only in our *americanus*. The description, however, does not agree with *americanus* nor any of the described varieties. Many localities of Reitter's material are wrong and I believe that the N. Amer. locality for this species is also a mistake.

*Tenebroides patruelis* Reit. Verh. Nat. Ver. Brünn XIII, 1875, p. 70.

Reitter's specimens from which he described the species are said to be from "Brazilia and Carol. merid." The N. Amer. locality is very likely wrong as I am unable to apply his description to any of our North American species.

#### Tribe OSTOMINI.

1. Front coxal cavities closed.....**Calitys**  
Front coxal cavities open behind.....2.
2. Mentum transverse; antennal grooves feeble.....3.  
Mentum oval, minute; antennal grooves deep.....5.
3. Elytra with more or less distinct costæ, upper surface smooth.....4.  
Elytra without costæ, irregularly punctate; upper surface distinctly pubescent .....**Ostomodes**
4. Hook-like process of inner lobe of maxillæ situated externally; antennal club loosely jointed, last joint ovate, narrowing towards apex; larger species about 5-10 mm. ....**Ostoma**  
Hook-like process of inner lobe of maxillæ situated internally; antennal club compact, last joint short, widening towards apex, small species about 3 mm. ....**Lophocateres**
5. Elytra without costæ, irregularly punctate; metasternum on each side below middle coxæ with an arcuate line; convex species.....**Thymalus**

*Ostoma grossa* and *oblonga*.

These two European species are wrongly included in our list.

*Ostoma oregonensis* new species.

Very close to *quadrilineata* Melsh., color castaneous, prothorax more shining, less strongly narrowing towards apex and punctures more widely separated than in *quadrilineata*; intervals of elytra with three rows of moderately coarse and well separated punctures between the costæ, the row next to each costa regular, the punctures of the median row rather widely separated and irregular. Length 7.5 mm.

Dilley, Oregon.

This is the *Grynochris oregonensis* of our list which has never been described by Crotch.

*Lophocateres americanus* Mots.

The species of this genus are very small and closely related to *Ostoma* subg. *Grynocharis*.

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## NOTES ON SOME CHANGES IN THE LIST OF COLEOPTERA.

BY CHARLES W. LENG.

STATEN ISLAND, N. Y.

A few happy days in September, 1918, were spent with Mr. Wm. T. Davis in the U. S. National Museum, where Dr. E. A. Schwarz and Mr. Herbert S. Barber very kindly examined the manuscript of my List of Coleoptera and gave me the benefit of their fund of information on some groups as they looked over the pages. These notes result, and as much of the information is otherwise unpublished, they are now printed with the permission of my informants.

Other unpublished notes have also been received in correspondence with Mr. J. M. Swaine and other friends and are likewise included.

On November 24, Colonel Casey's Memoirs VIII was received and several notes in the Carabidæ result therefrom, since it is devoted principally to that family.

I have not adopted Colonel Casey's view that the genus *Pterostichus* of Bonelli does not occur in America. I am fully in accord with the restriction of its meaning to the western forms he includes under *Hypherpes* Chd.; but until a revision of the Pterostichini of the world is made, it seems premature to announce (in substance) such an important fact in distribution as is implied in asserting that our species belong to different genera than the Palearctic species.

*Pterostichus agonus* Horn, by the description, which mentions its near relation to *punctatissimus*, evidently belongs in *Lycrophcrus* Mots. if *punctatissimus* does.

It is unfortunate that Colonel Casey did not compare the species described by Poppius, 1905 and 1907, in the genus *Cryobius*; there are

already a considerable number of described species and the addition of four more regardless of preceding work may not improbably enrich the synonymy.

Colonel Casey (Memoirs, VIII, p. 243) says: "If the genus *Bra-dytus* [heretofore regarded as a subgenus of *Amara*] is to be maintained, the name *septentrionalis* of Leconte [heretofore replaced because of previous use in *Amara*] is to be restored." This is contrary to Art. 36 of The International Code by Stiles, 1905, and Art. 26 of The Entomological Code by Banks & Caudell, 1912; it is also contrary to the traditional maxim, "once a synonym always a synonym," though the names here referred to would now be called homonyms, and I think Colonel Casey is wrong.

*Bembidion pugtanum* Csy., 1918, p. 148, is preoccupied by *pugtanum* Fall, 1916 (Bull. Br. Ent. Soc., XI, p. 13), and may be changed to *caseyi* n.m.

The name *blaisdelli* proposed on page 222 for *Bembidion concinnum* Blaisdell is unnecessary, Dr. Blaisdell having himself changed the name fourteen years ago to *perconcinnum* (Ent. News, XV, 1904, p. 349). In this connection it has been suggested to me by Mr. Fall that when the original author is accessible it is perhaps better to give him the opportunity of changing any preoccupied name himself than to seize the opportunity of doing so; especially as the change may already have been made in some overlooked item, as in the present instance.

Colonel Casey's revision of Pogonini, issued November 12, 1918, was of course in the printer's hands before Dr. Van Dyke's article in the October number of Ent. News had appeared. I have been obliged to alter some of Colonel Casey's conclusions in the tribe Pogonini on account of this article of Dr. Van Dyke's and for other reasons.

In *Loxandrus*, I believe Colonel Casey has misapplied the name *rectus* Say, in citing *laticollis* as a variety thereof. As I have previously shown (Bull. Am. M. N. H., XXXIV, 1915, p. 578) *rectus* Say and *velox* Dej. are closely related if not identical and *laticollis* Chd. belongs with *lucidulus* Dej. and *erraticus* Dej. in that section of the genus having obtuse hind angles to the prothorax. Since only nine out of twenty-seven previously described species are recognized by Colonel Casey, I have thought it best to follow the manuscript I had prepared, interpolating his new names.

*Selenophorus excisus* Lec., 1878, is said by Horn, 1880, and in Mr. Henshaw's Bibliography of Leconte's writings to be a preoccupied name. If this is so and Casey's paragraph (p. 413, Mem., VIII) is correct, we must cite *S. mustus* Csy. as the species.

The varieties of *Scaphinotus andrewesi* and *guyoti* described by Mr. Beutenmüller (Bull. Br. Ent. Soc., 1918, p. 89) do not profess to be more than color forms, and should be treated as such.

*Elaphrus politus* Casey, 1897, is preoccupied by *E. politus* Leconte, 1850 (a synonym of *E. clairvillei* Kirby), and may be changed to *caseyi* n.m.

*Galerita thoracica* Casey, 1897, is preoccupied by *G. thoracica* Chev. (Col. Mex. Cent., I, fasc. 2, No. 34) and may be changed to *caseyi* n.m.

*Platynus deplanatus* Men., 1844, is preoccupied by *P. deplanatus* Chaud., 1843 (a synonym of *cincticollis*), and may be called *P. fulianus* n.m.

*Tachypus* Lacordaire, 1854, is preoccupied by *Tachypus* Weber, 1801, a synonym of *Carabus*. Redtenbacher credits *Tachypus* to Megerle, as a synonym of *Bembidium*. Casey credits it to Dejean, but that author cites Weber's use of the name. I have followed Gozis in regarding the name as preoccupied and replaced by *Asaphidion* Gozis.

In the Carabidæ of Florida the reference to a Carabid beetle feeding on *Metachroma* larvæ on leaves is erroneous because all *Metachroma* larvæ live under ground, as I am told by Dr. Schwarz.

The genus *Omophron* should be placed, as indicated by Lameere, between Carabidæ and Haliplidæ, and treated as a family.

*Pseudaptinus* Castelnau, 1835, must be used in place of *Diaphorus* Dejean, 1831, because the latter name was first used by Meigen in 1824. See Maindron, Bull. Soc. Ent. Fr., 1906, p. 252.

*Agabus semivittatus* occurs in Florida. The mention of St. John's Bluff, East Florida, by Dr. Sharp was overlooked in preparing the "Water-beetles of Florida."

*Sphærites* should be removed from Silphidæ, as indicated by Ganglbauer and other authors, to form a family near Histeridæ.

*Brathinus* should be removed from Scydmaenidæ. Colonel Casey thinks it should form a genus of Staphylinidæ near *Lesteva* on account of ocelli, but the entire elytra appear to forbid this course. It seems best placed as a family in Staphylinoidæ.

*Bledius dissimilis* Fall, 1910, is preoccupied by *B. dissimilis* Er., 1839 (Gen. Spec. Staph., p. 769), and has been changed to "*philadelphicus*" by Mr. Fall in Ent. News. *B. fratellus* Fall, 1910, is also preoccupied by *B. fratellus* Eppelsch., 1885 (D. E. Z., XXIX, p. 144), and has been changed to "*transitus*" by Mr. Fall in Ent. News.

*Mycetoporus tenuis* Horn, 1877, is also preoccupied and may be replaced by *horni* n.m.

In Aleocharinæ certain changes have been made on the basis of a letter from Colonel Casey which will be filed in the minutes of the N. Y. Ent. Soc.

The name *Megalops* Erichson, 1840, is preoccupied by *Megalops* Lacep., 1803, for a genus of fish. The name *Megalopsidia* may be substituted.

In Coccinellidæ I assume responsibility for such synonymy as has not already been published; such being as I believe in harmony with the known variability of the maculation, and with studies on the genitalia to be published by Mr. P. H. Timberlake.

*Spilota* Burm., 1844, is preoccupied by *Spilota* Billberg, 1820 (Enumeratio Insectorum in Mus. Billberg, p. 61). The latter, according to a manuscript by Mr. P. H. Timberlake, is a synonym of *Coccinella*. It seems as if *Pachystethus* Blanchard, 1851, should be used in place of *Spilota* Burm.

In *Hippodamia* the work of Mr. P. H. Timberlake indicates that the study of the genitalia will show that, while the division of the genus into sections based on the form of the claws is confirmed, a larger number of forms are entitled to specific rank than I had supposed; and that in the *convergens* group some of the varieties named by Casey and Johnson have been erroneously placed by them. However, the variability of the genitalia in *Lachnosterna* has been shown by Glasgow to be rather greater than Smith supposed in his first enthusiastic treatment of that genus; and, as Mr. Timberlake's manuscript (which I have been allowed to read before publication) indicates that he desires to confirm his conclusions by the study of more material, I am unwilling to accept a few of the changes immediately.

The tribe Tetratomini has been transferred from Melandryidæ to Mycetophagidæ. This reverses Casey's idea (Journ. N. Y. Ent. Soc., VIII, 1900, p. 166), but with his verbal approval, when I visited him in Washington.

The name *Acolpus* Jayne, 1882, is very close to *Acolpos* Brandt (Act. Acad. Pet., 1835), but, if the original spelling of the latter is followed, no change seems necessary.

*Acritus atomus* Lec. described from Cuba, occurs at Lake Worth and Biscayne Bay, Florida. There are Florida specimens in the Blanchard collection as well as those in the Nat. Mus.

*Hctarius helenæ* Mann, described from Mexico, occurs also at several places in Arizona. *H. carinistriatus* Lewis (teste W. M. Mann) is a synonym of *H. blanchardi* Leconte.

*Carpophilus* (subgenus *Urophorus*) *humeralis* Murray known from Philippines, Seychelles, Java and Africa, has been introduced at Oneco, Florida. As it can live in decaying fruit it is liable to be spread further by commerce.

*Coluocera madracæ* Woll. This species, described from Madeira, has been found in Brazil, Trinidad and Haiti and is very likely to occur in Florida. It is nearly cosmopolitan, having reached India as well as the countries named.

*Eubrianax* Kies. (= *Placonycha* Horn) has a larva superficially like that of *Psephenus*, as I was informed by Dr. Schwarz. Professor Wickham, who was present, added that the adult occurs on stones in water like *Psephenus*. The genus should perhaps be transferred from Dascillidæ to Psephenidæ.

*Cryptohypnus planatus* Lec., 1866, is preoccupied by *C. planatus* Esch., 1829, and may be changed to *C. lecontei* n.m.

*Melanotus longicornis* Blatchley, 1910, is preoccupied by *M. longicornis* Cand., 1860, and may be called *M. blatchleyi* n.m.

*Ludius* (*Corymbites*) *elegans* Cand., 1888, is preoccupied by *L. elegans* Kby., 1837, and may be called *L. candzei* n.m.

*Octinodes* Cand., 1863, should be used for the American species heretofore called *Plastocerus*. The type and only species of *Plastocerus* Schaum, 1852, is *angulosus* Germ. from Asia Minor. Dr. Leconte sent an American species which he believed belonged to that genus to Schaum and, upon receiving his confirmatory reply, described in 1853 *Plastocerus schaumii*. This species is not congeneric with the Asiatic species but apparently belongs to the genus erected by Candèze in 1863, as do several others from Central and South America. The type of this genus is *Octinodes capillatus* from Venezuela. European authors have incorrectly treated *Plastocerus* as Dr. Leconte's

genus, unnecessarily proposing several new names for the Asiatic species. Mr. H. S. Barber has furnished these facts.

Mr. J. A. Hyslop has by letter called attention to the following preoccupied names in Elateridæ:

*Monocrepidius finitimus* Csy. is preoccupied by *M. finitimus* (Say) Lec., and may be called *M. caseyi* n.m.

*Elater discoideus* Fab., 1801, is a primary homonym of *Elater* (*Adlocera*) *discoidea* Weber, 1801, and may be called *sellatus* Dej. Cat. 3, ed. p. 104.

*Ectomenogonus* (*Elater*) *hepaticus* Melsh. is preoccupied by *Crigmus* (*Elater*) *hepaticus* Germ. and may be called *melshheimeri* n.m.

*Anchastus horni* O. Schwz., n.m. for *A. sciricus* Horn is unnecessary, the name having been already changed to *scicans* by Candezze (Cat. Meth., 1891, p. 106).

In Buprestidæ certain changes are based upon studies made at the American Museum of Natural History, where several large collections were assembled for the purpose, and upon conversation with Colonel Casey, though he is not in any way responsible for them.

*Attalus submarginatus* Lec., which was not recognized when Dr. Horn's revision was written, has been found by Dr. Schwarz at Catalina Springs, Arizona. It is, however, not an *Attalus*, but represents a new genus, nearer to *Chatocalus* than to *Attalus*, which may be called *Attalusinus*.

*Catorama tabaci* has been introduced in tobacco; also *Thaneroclerus girodi*, its Clerid enemy; see Proc. Ent. Soc. Wash., XV, 1913, p. 89.

*Sitodrepa* apparently has to be replaced by *Stegobium* Mots., 1860, a prior name. *Priobium* Mots., 1845, must also replace *Trypophytis* Redt., 1858.

*Bostrichus fasciculatus* Fall is a synonym of *Lichenophanes penicillatus* Lesne, described in Ann. Soc. Ent. Fr., 1895, p. 171, and figured in the same publication, 1898, p. 495. The type locality for Lesne's species is Durango, Mexico, and it is probable that many of the species described therefrom will ultimately be found in the United States. *L. verrucosus*† Gorh. Biol. C. Am., 1886, p. 353, is the same species.

*Berginus* seems best placed in Lyctidæ, as proposed by Colonel Casey in 1900 and approved by Champion (Tr. Ent. Soc. Lond., 1913).



*Cis pusillus* Dury, 1917, is preoccupied by *C. pusillus* Gorham, 1898 (Proc. Zoöl. Soc. Lond., p. 330), and may be changed to *C. dunedinensis* n.m. *Cis bicolor* Dury, 1917, is also preoccupied by *C. bicolor* Sharp, 1879 (Trans. Ent. Soc. Lond., p. 93), and may be changed to *C. duryi* n.m.

*Aphodius v. niger* Ckll., 1888, is preoccupied by *A. niger* Panz, 1797 (Faun. Germ., 37, 1), and may be changed to *cockerelli* n.m.

*Dichclonyx* Harris (Mass. Agl. Repository, X, 1826, p. 6 (note)) antedates *Dichclonycha* Kirby, 1837. The name has not been used because no description accompanies it; but as Dr. Harris designated *lincais* as its type, it must be valid under International Rules of Nomenclature.

The genus *Adetus* must be added to our fauna as a species, at present unidentified, occurs in Lower California.

The figure (No. 125) of *Anaglyptus compressicornis* given by Gory shows the antennæ with very short second joint. All the figures on the plate indicate that the artist was careful in representing the relative length of the antennal joints. Therefore it seems probable that it is our *Microclytus gibbulus* that is a synonym of Gory's species and not *M. gazellulus*.

The figure of (*Edionychis*?) *liturata* given by Olivier, p. 707, seems, from its outline and peculiar maculation, to represent a species of *Ora*.

In *Leptinotarsa* nine names proposed by Tower, 1906 (Investigation, etc., of *Leptinotarsa*), and defined by figures or description are included under *L. decemlineata*. They cannot be dismissed as laboratory products for outdoor localities are given for seven. The name selected for one (*tortuosa*) is preoccupied.

*Pachybrachys instabilis* Fall, 1915, is preoccupied by *P. instabilis* Weise, 1887 (D. E. Z., XXXI., p. 330), and has been changed to "*P. hector* n.m." by Mr. Fall in Ent. News.

*Leptinotarsa melanothorax* does not occur in the United States. The specimen so called in Geo. H. Horn's collection has been pronounced simply a discolored *10-lineata* by Dr. Tower.

*Leptinotarsa violascens*, as identified by the late Frederick Knab, occurs in Arizona. This species, with *rubiginosa*, *behrensi*, *haldemani*, *dahlbomi* and *lineolata*, may belong to the genus *Myocoryna*.

The group of species related to what we have heretofore called

*Crepidodera helxines* seem to belong to the genus *Chalcoides* Foudras (Ann. Soc. Linn. Lyon., VII, 1860, pp. 17, 1281). It is possible also that our species of *Haltica* belong in part to his genus *Hermæophaga*.

The name *Monachus* Suffr., 1852, is preoccupied by Kaup, 1829, for a genus of birds and may be changed to *Monachulus* n.m.

*Longitarsus varicornis* Suffr., *L. subcinctus* Harold, *L. heliophyti* Horn should be united under the first name, which is the earliest. The food plant is *Heliophytum indicum*; and, since where it grows a house stands or stood, it usually serves an unintended purpose of marking a trail.

*Graphops bicolor* Lef. and *simplex* Lec. are synonyms. The species should be known as *bicolor*, which is the earlier name.

*Cassida bivittata* Say is, fide Mr. Barber, certainly not a *Cassida*. Its nearest relative seems to be certain vittate Central American species of *Mettriona*, in which genus it should be placed for the present.

*Agelastica alni* Linné is a European species that has been found in New Jersey. *A. carulea* Baly, credited to Japan and North America, is probably identical. See Weise, Naturg. Ins. Deutschl., VI, 580.

*Chlamys nodulosus* Blatchley is a synonym of *Exema gibber* (Oliv.), as the latter has been identified in the U. S. National Museum collection. *E. gibber* is abundant in Florida.

*Agelasa halensis* has not been found in North America.

*Malacosoma* Chevrolat is a preoccupied name which has been replaced by *Exosoma* Jacoby. See Trans. Ent. Soc. Lond., 1903, p. 25.

In the course of some general remarks on Halticinae Dr. Schwarz said that as advocated by Harold (Col. Hefte) a study of the tibiae, especially in reference to the emargination near its apex, might produce a more natural arrangement than that at present in use, which seems to separate some apparently closely related forms. In *Paria*, a new study of the varieties of *canella*, in conjunction with food plant, would perhaps show some to be of specific rank; in *Haltica* also he thought more study of food plants should precede further descriptive work; since which Bull. 273, Maine Agl. Exp. Sta., dealing with species allied to *ignita* has appeared.

*Sicinus guatemalensis* is an earlier name for *Gnathocerus dentiger* Chitt. Dr. Chittenden assigned his species to *Echocerus*. It is common in Cuba.

*Leichenium variegatum* Klug, as identified provisionally by M. Lesne of Paris, is to be included on account of many specimens found by Mr. H. P. Loding at Mobile, Ala.

The genera *Paratenetus*, *Prataeus* and *Anædus* of the family Tenebrionidæ seem to be near the Lagriidæ on account of the similarity in their larval stages and the tropical forms intermediate between them and *Lagria*.

*Cistela* Fab. has been replaced by *Pseudocistela* Cr., 1873. The genus *Gonodera* Muls., Col. Fr. Pectin., 1856, p. 41, may cover our species and if so would antedate Crotch's name.

*Anthicus currax* Champ., a maritime species, is common at Brownsville, Texas. Casey's *A. floridanus* is synonymous.

*Acanthinus spinicollis* Laf., described from Brazil, occurs through Central America and at Brownsville, Tex. An allied West Indian species, identified by Dr. Schwarz as *A. trifasciatus* Fab. occurs also at Key West, Fla.

*Anthicus heroicus* Casey is common in the egg masses of *Corydalis cornutus*.

*Dendroides testacea* Lec. is probably not an absolute synonym of *ephemeroides* Mann. At the suggestion of Dr. Schwarz, prompted by Mr. Blair's paper in Ann. and Mag. Nat. Hist., 1914, I asked Mr. Fall to investigate the material at Cambridge. His comparison of the Sitka example there with Dr. Leconte's type discloses certain small differences; but further examples might lead to a change of opinion.

*Pomphopæa femoralis* Lec. is made a variety, not a synonym, of *P. polita* Say on comparison of a specimen recently collected in Florida by Mr. Blatchley.

The family Stylopidae has been recently treated by Dr. W. Dwight Pierce as an order, Strepsiptera. While it is doubtful if all Coleopterists are in accord with his views, the family is placed as an appendix in the new Check List, in deference to his opinion.

*Orchestes scutellaris* is a European species that has to be added to our introduced fauna. It has been recorded from Canada (Bro. Germain in Cat. Ent., 1915, p. 309) and has also been found in Connecticut.

*Hormops abducens* occurs in Texas, at Waco, Basque Co., as shown by a letter of Dr. Leconte's to the late Geo. W. Belfrage.

This Texas specimen should still be in the Leconte collection. This extends its distribution previously known to cover only Florida and the District of Columbia.

The name *Eudocimus* Schonherr, 1836, is preoccupied by Wagl., 1832, for a genus of birds and may be changed to *Eudociminus* n.m.

*Calendra* (not *Calandra*) seems to be the spelling used by Clairville in Ent. Helv., I, 1798, p. 62, and throughout the text and explanation of plate on pages following. The word is spelled with an "a" once at the top of plate II.

#### SCOLYTIDÆ.

The name *Ipoidea* is used instead of *Scolytoidea*, and *Eccoptygaster* instead of *Scolytus* by Mr. J. M. Swaine, the most recent authority on bark beetles, because, in his opinion, Geoffroy's description of *Scolytus*, though the earliest, is not binomial and does not designate any species definitely.

The contrary opinion has, however, been expressed in letters from other friends by which it appears that the word "uninomial" in Art. 2, International Code, was used to cover such cases; and that the word "binary" in Art. 25, having a different significance from binomial, is of importance. Opinion 20 (Smithsonian Publ. No. 1983, p. 48) and Opinion 46 (Smithsonian Publ. No. 2060, p. 105), both ratified at ensuing International Congress, have also been cited. Under such rulings Geoffroy's genus *Scolytus*, containing one unnamed species, dates from 1762 and the name has priority in determining the name of the genus and family.

*Scolytus* is certainly the earliest name, and its rejection under the Rules of Nomenclature depends upon their interpretation, in which opinions differ. I have therefore adhered to the earliest name; though I have followed Mr. Swaine's classification otherwise.

*Thysanoes quercus* Hopk. cited in Smith's List is omitted because it has never been described.

*Ips terminatus* (p. 148, under *Tomicus*) of the Henshaw List is omitted, being probably an error for *terminalis* Mann.

The following names are omitted at the suggestion of Mr. J. M. Swaine, for lack of reliable American records, north of Mexico:

*Platypus cylindrus* Fab.

*Crypturgus pusillus* Gyll.

*Rhopalopleurus pumilus* Chap.

*Leperisinus fraxini* Panz.  
*Hylurgops glabratus* Zett.  
*Trypodendron lineatus* Oliv.  
*Cryphalus piceæ* Ratz.  
*Cryphalus abietis* Ferr.  
*Anisandrus dispar* Fab.  
*Xyleborus viduus* Eich.  
*Xylocleptes bispinus* Duft.

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## MISCELLANEOUS COLEOPTEROLOGICAL NOTES AND DESCRIPTIONS.

BY CHAS. SCHAEFFER.

BROOKLYN, N. Y.

**Languria denticulata** new name.

*Languria apicalis* Schaef.

The name *apicalis* is preoccupied in this genus. Motschutsky, 1860, described *L. apicalis* which is considered a synonym of *mozardi*.

**Languria convexicollis** Horn.

*Languria interstitialis* Casey.

Colonel Casey differentiates his species from *convexicollis* principally on the form of the sixth joint of the antennal club and on the punctuation or sculpture of the elytral intervals. The former character is sexual and the latter, the punctuation or sculpture of the elytral intervals, is variable. The irregular rugiform creases of the intervals when present obscure or obliterate the very fine punctuation. In a moderate large series specimens may be found which have some of the intervals smooth and some more or less rugosely creased.

**Acropteroxys divisa** Horn.

*Acropteroxys thoracina* Casey.

I have taken a number of specimens of this species in the Huach Mountains, Arizona, in which the black basal markings of the prothorax are extremely variable in extent and are almost obsolete in one specimen. The difference in the form of the antennal joints

described by Colonel Casey for *divisa* and his *interstitialis* are present in my series from Arizona and are those of the male and female respectively.

**Acropteroxys gracilis** var. **texana** new variety.

A form taken rather commonly at Brownsville, Tex., agrees with typical *gracilis* except that the prosternum around the front coxæ is black as in *divisa* Horn. The black prothoracic spot is as in *gracilis*, that is, longitudinal. In *divisa* it generally covers more or less the entire base.

Brownsville, Texas.

**Triplax mesosternalis** Schaef.

*Triplax monostigma* Casey.

Typical *mesosternalis* have the prothorax with three anterior black spots, one at the middle of anterior margin and one on each side near the lateral margin. The central spot is always distinct but the two lateral spots are sometimes only faintly indicated or entirely absent. I have specimens from Colorado, Arizona and New Mexico.

**Chrysobothris sexfasciata** new species.

Very similar in form and coloration to *C. chrysala*. Head feebly convex in front; eyes relatively narrowly separated and connected above by an arcuate carina, occipital carina faint; clypeus more or less distinctly triangularly emarginate at middle, subtruncate each side; antennæ nearly as in *chrysala* but with the third joint slightly shorter. Prothorax transverse, sides arcuate each side; disc moderately convex without depressions or callosities; punctuation moderately coarse, punctures at sides near base larger and separated by more or less distinct narrow ridges. Elytra wider than the prothorax; the margin serrulate; disc without trace of costæ; basal fovea deep, median fovea faint; a green basal fascia connected at sides with a slightly arcuate submedian fascia; a slightly oblique postmedian fascia and the extreme apex of the same color; surface moderately coarsely punctate, disc without costæ; near the lateral margin from the submedian to the subapical fascia a more or less distinct and more coarsely and closely punctate impression. Ventral segments moderately coarsely punctate; lateral margin of last segment entire, apex entire and slightly arcuate, without acute angles. Prosternum rather truncate; anterior femur with an acute tooth, not serrulate within. Length 4.5 mm.

Key West, Florida.

Type in the collection of the Brooklyn Museum, received through the kindness of Mr. Alan S. Nicolay.

This species is apt to be taken for a small *chrysala*, which it resembles very closely. It differs, however, from that species in having

the sides of clypeus not rounded but truncate, the eyes above relatively more closely placed, the prothorax with rounded lateral margin and anterior angles not truncate and the elytral apex always of the same bright green color as the other fasciæ.

I am uncertain of the sex but whether male or female the apex of last ventral segment is different from those of *C. chrysala*.

**Mastogenius puncticollis** new species.

Black, bronzed, glabrous. Head convex with a more or less distinct median impression: moderately coarsely and not closely punctate; antennæ extending about a little below the hind angles, serrate from the fourth joint, second joint short, globose, third elongate about as long but much narrower than second, shorter than the fifth and scarcely half as long as the fourth. Prothorax a little wider than long, widest a little behind middle; feebly converging towards base, more rapidly towards apex; surface rather coarsely and moderately closely punctate, intervals between the large punctures densely punctate with much finer punctures; at middle a more or less distinct, elongated, narrow, feebly elevated line. Elytra as wide at base as the basal margin of prothorax; sides subparallel; surface glabrous, rather less coarsely punctate than the prothorax, and with the punctures a little more widely separated. Prosternum and metasternum rather coarsely punctate; ventral segments more finely punctate, the punctures more widely separated. Posterior margin of hind coxal plate broadly sinuate. Length 3 mm.

Huachuca Mountains, Arizona.

Differs from all our species in the shape and punctuation of prothorax.

**Trigonogya** new genus.

Head convex, very feebly impressed; antennæ dentate from the fourth joint. Eyes oval, nearly parallel. Prothorax truncate at base. Scutellum small, subtriangular. Elytra convex, truncate and deeply impressed at base. Prosternum truncate in front, laterally with distinctly limited antennal cavities and with a fine carina on each side of middle. Mesosternum invisible. Metasternum truncate in front. Posterior coxæ nearly contiguous; coxal plates feebly dilated internally and externally.

Type—*Mastogenius reticulaticollis* Schæf.

This new genus differs from *Mastogenius* and, judging from the descriptions, from all the known genera of the tribe Mastogenini by the distinct antennal cavities of the prosternum and seemingly also by the carinate prosternum.

## TABLE OF THE NORTH AMERICAN SPECIES OF THE TRIBE MASTOGENINI.

1. Prosternum with distinctly limited, subtriangular antennal cavities and distinct carina on each side of middle; posterior margin of hind coxal plates feebly emarginate; third joint of antennæ small; prothoracic sculpture reticulate; color black, elytra bluish. *Trigonogya reticulaticollis* Schæf.  
Prosternum without antennal cavities and without carinæ at middle, **Mastogenius** 2
2. Posterior margin of hind coxal plates more or less sinuate or emarginate; the exterior and interior angles slightly prominent; front convex and more or less distinctly impressed ..... 3  
Posterior margin of hind coxal plates oblique and internally rather broadly dilated; color æneous; front convex and sometimes with feeble median impression; third antennal joint shorter than fifth. *M. robustus* Schæf.
3. Third antennal joint shorter than fifth; prothorax widest below middle; coarsely and rather closely punctate, punctures as large, or a little larger, as those on elytra; intervals between the large punctures very finely and densely punctulate..... *M. puncticollis* Schæf.  
Third joint of antennæ about as long or slightly longer than the fifth; intervals between the large prothoracic punctures not densely punctate, smooth ..... 4
4. Prothorax widest at apical third; a small foveiform impression near middle of side margin and a very fine and faint median impressed line which reaches neither base nor apex; third joint of antennæ scarcely more than half as long as the fourth..... *M. impressipennis* Fall.  
Prothorax widest at about middle, without small foveiform impression near side margin at middle and without median impressed line; third joint of antennæ more than one half as long as the fourth... *M. subcyaneus* Lec.

*Haltica scutellaris* Oliv.

Specimens which undoubtedly are this species occur at Brownsville, Texas. It is very near our *H. rufa* and colored like that species but the upper surface is very shining and much more finely punctate and the antennal joints are a little longer and narrower with the third and fourth joints nearly equal in size.



## STUDIES IN RHYNCHOPHORA, VI. "THE NEW YORK WEEVIL."

By D. SHARP,

BROCKENHURST, ENGLAND.

*Ithycerus novboracensis* was termed the New York weevil by Riley. It is the only species of its genus, and at the same time the only species known of a very distinct subfamily. It is therefore of much interest and importance, and my object in writing this brief paper is to make known its extremely peculiar sex characters and to point out that by these, as well as by some of the body-characters, it is allied to the Australian Belidæ. This affinity is exhibited more strongly by the male than it is by the female. Such of the female Belidæ as I have examined possess a well-developed ovipositor, while this structure is absent in *Ithycerus*, the vaginal plates and palps being attached to the margin of the membranous vulva. Hence I believe it will be best to treat *Ithycerus* at present as an isolated subfamily of Belidæ. This family is largely represented in Australia by quite a variety of remarkable forms, very few of which have been well investigated, hence it is not improbable that the subfamily Ithycerides may later on not be found to be so distinct from other Belidæ as appears at present to be the case.

Two or three species of Belidæ are known from South America; I have not been able to obtain specimens of them for study as they are at present very rare in collections, but judging from superficial inspection it would seem that they have very little relation to *Ithycerus*. No Belid occurs in Central America, and in fact none but *Ithycerus* occurs in the whole of the northern hemisphere: there are a few representatives of the family in New Guinea and New Zealand.

The body characters of *Ithycerus*, though agreeing in important characters rather strongly with Belidæ, depart in certain particulars, the most important of which are the definite club of the antennæ, and the thicker rostrum with much larger mouth-parts.

The genitalia of the Belidæ are at present known only by the figure and brief description of the male parts given by F. Muir and

myself (Trans. Ent. Soc. London, 1912, p. 571, pl. LXXVI, f. 223) where the sac is not extended, and consequently is only imperfectly shown; those of *Ithyercus* I believe are quite unknown, and I give below the best sketch I can manage from the material at my disposal, and for which I am much indebted to Mr. C. W. Leng. The illustrations accompanying are due to Mr. and Mrs. F. Muir.

*The male characters.*—On superficial inspection of the abdomen six segmental plates are visible ventrally, that is one more than is usual in Rhynchophora. On dissection, however, it is seen that the apical one is really a part of the dorsum. This has already been explained by Dr. G. H. Horn, and will readily be understood by looking at our Fig. 1. In *Bclus* the arrangement is similar except that the last segment is withdrawn into the penultimate one. Extraordinary as is the last dorsal plate the corresponding ventral (Fig. 2, VIII) is even more remarkable. It is reduced to an undivided, sinuous, half-ring, very hard, and prolonged in the middle in the anterior direction as a short strut, above which reposes the fork of the speculum which is like a Y with a very long stalk, and on this fork there is a fold of membrane, having on each side a slender streak of chitin (*x* in Fig. 4); just beyond and between the fork and the rods is the distal extremity of the genital tube—the genital orifice. Owing to this disposition of the parts of the last segment, the anal and genital orifices are placed in a cleft anterior to the termination of the body instead of at its extremity as usual (Fig. 3).

The ædeagus (Figs. 6 and 7) is very remarkable; the delicate membrane that forms the apical part of the genital tube is of unusual elongation, and permits the ædeagus to be withdrawn far into the body, the tip of the median lobe (the so-called "penis") being then 2.5 millimeters away from the spot where it finds exit. This membrane being severed and removed, the ædeagus can be taken out and then, in its contracted form, presents the appearance shown in Fig. 6, the outer part being the tegmen (*t f. 6*) through which the median lobe plays (*ml*): this tegmen is of peculiar form; the bridge (dorsal part, or cap-piece) consisting of two chitinizations connected into one piece by strong membrane, but each projecting distally as a long, free, illiate lobe, with a U-like space between them; the strut (*ts*) ventrally placed is long and nearly straight and the sides forming its fork are large and continued dorsally as the lobed plates of the cap

just described. The tegmen can be easily dissected off and then the median lobe (*ml*) and its sac (*is*) can be seen; this lobe ("penis") is tongue-like in form; its dorsal aspect is of tough, transparent membrane, with a stronger, chitinized yellow strip along the middle: the lower aspect is membranous basally, but the sides and tip are hard and dark; the struts (*ms*) are long, flat plates, a little longer than the body of the lobe, and where they join the body a strong chitinous band passes all across the dorsal aspect and from it departs the median dorsal strip described above, and it is also continuous with the strong margin of the lowest aspect.

The sac (*is*) is highly peculiar; it is shown in contraction in Fig. 6, and extended (but not completely) in Fig. 7, where it is seen to be an elongate membranous tube, rendered irregular by projecting lobes, and bearing apically a long slender flagellum (*f*) at the termination of which is the functional orifice; in Fig. 7 this termination cannot be seen as it is twisted under the sac, but it is shown in Fig. 6. This flagellum is however probably not really the termination of the organ, for there is nearly certainly within it another very delicate and protrusible flagellum that bears the true functional orifice.

*The female genital structures.*—The abdomen has seven visible dorsal plates, six of which are membranous, the seventh, or apparently terminal one, being chitinized and black, grooved along the middle. Ventrally only 5 segments are apparent, but on taking off the abdomen two others can be distinguished in close apposition with the metasternum and coxæ. The five visible plates are subequal in length, the sutures (or rather lines of separation) are slight, and have very little mobility, so that curving of the abdomen is impracticable. On taking off the abdomen, and examining the apex an eighth abdominal segment is disclosed. The eighth dorsal is rather long and hard, and its base is connected by membrane with an eighth ventral, which is shovel-like in shape, and has a slender handle or strut about as long as itself. This eighth ventral is connected with the seventh by a very ample membrane which is folded forwards; along the middle of the shovel there is a membranous space that anteriorly does not extend so far as the beginning of the strut. From within the eighth segment there protrudes the termination of the genital tube in the form of a pair of large corneous plates or vaginal palps,

each of which is a two-segmented structure, of which the basal part is a hard, narrow, long plate, ciliate at the margin and bearing a minute, terminal, freely-articulated segment.

The alimentary canal terminates just above the base of these vaginal plates, so that just above the anus is the termination of the genital tube, there being nothing between the two orifices but a little membrane. The genital orifice is membranous, ample, and proceeding forwards very soon divides into two branches, one of which is soon strongly elbowed, and then narrows to form a spiral duct that bears the spermatheca; this is of very remarkable and unusual form, a bent, long tube, with a round head; the duct enters close to the head, and at the same place there is connection with a rather long, tubular gland.

#### EXPLANATION OF PLATE X.

(*All of the male.*)

FIG. 1. Profile of abdomen.

FIG. 2. Ventral aspect of last segment.

FIG. 3. Connection of dorsal and ventral plates of last segment (diagrammatic).

FIG. 4. Terminal portion of genital tube.

FIG. 5. Last ventral plate, spiculum and terminal portion of genital tube.

FIG. 6. Ædeagus as extracted, in contracted state.

FIG. 7. Internal sac; approximation to its functional condition of extension: dorsal aspect.

The lettering is uniform throughout, viz.: Numerals, 1-8, dorsal sclerites of abdomen; I-VIII, ventral sclerites.

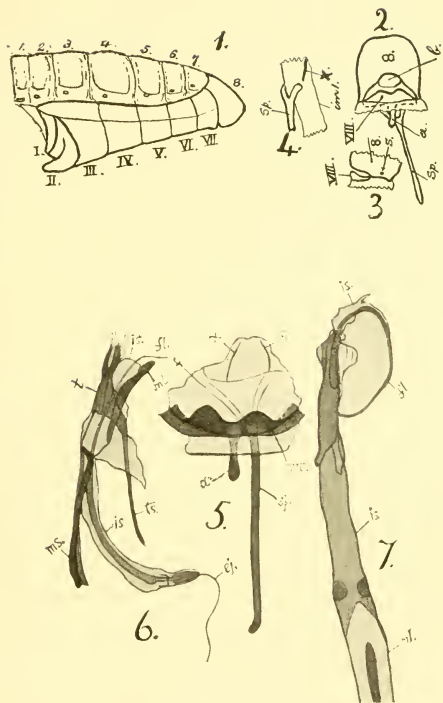
Letters, *a*, strut of last ventral; *b*, anus; *cm* 1, first connecting membrane; *ej*, duct from the testes; *f*, fork of speculum; *fl*, flagellum; *is*, sac; *ml*, median lobe; *ms*, median lobe struts; *s*, spiracle; *sp*, spiculum; *t*, tegmen; *ts*, strut of tegmen; *x*, chitin rod at termination of genital tube.

### NEW NORTH AMERICAN SPECIES OF APION.

By H. C. FALL,

TYNGSBORO, MASS.

Specimens of an *Apion* bred from galls on *Hibiscus moscheutos* at Arlington, N. J., have recently been sent me for identification by Mr. H. B. Weiss. An examination shows that they can not be re-



Ithycerus.



ferred to any of our previously known species, and at Mr. Weiss' request I give herewith a description of the species in order that it may be properly referred to in his and Mr. Dickerson's paper on *Hibiscus* insects. The opportunity is taken to make known several other new species of *Apion* that have come to hand since my revision of the genus. Single examples, mostly females, of some four or five other apparently new species are in my collection, two of which, from their appearance, I suspect are importations. These must await the turning up of additional specimens, including males, before they can be properly made known.

***Apion hibisci* new species.**

Moderately robust, black, tibiae and tarsi brownish piceous, pubescence thin, white, somewhat condensed at the base of the third elytral interval. Beak stout, cylindrical, moderately curved, subequal in length to the head and thorax in the male, a little longer in the female, rather densely punctate throughout in both sexes, a somewhat larger elongate puncture over the base of the antennae; first joint of latter one and one-half (♂) to twice (♀) the length of the second, and not quite reaching the eye. Front subequal in width to the tip of the beak, not sulcate. Prothorax obviously wider than long, sides parallel in about basal three-fifths then rather suddenly narrowed, the apex subtubulate; punctures coarse and moderately close, basal fovea not very conspicuous. Elytra one-third longer than wide, humeri quite broadly prominent, sides nearly parallel in rather more than basal half, intervals flat, one-half to three-fourths wider than the striae. Metasternum and first two ventral segments moderately punctate, the fifth vaguely more finely so. Length 2.4 to 2.7 mm.

Hab.: Arlington, New Jersey; taken from galls on *Hibiscus moscheutos* by Mr. H. B. Weiss, from whom I have received a good series of specimens.

This species belongs to Section IV of my Synopsis (Trans. Am. Ent. Soc., 1898) and would by the table fall near *attenuatum*, after which it may best be placed; differing by its stouter form, broader thorax, more parallel elytra, more basally inserted antennae, and paler tibiae and tarsi. The sexual differences are very feeble, consisting only in the slightly longer beak in the female.

***A. albidulum* new species.**

Form rather stout, black, clothed quite densely with elongate appressed white squamules. Beak slender, cylindrical, slightly longer than the thorax in the male, a little longer but shorter than the head and thorax in the female,

polished and sparsely punctate beyond the basal dilatation, which is distinct in the male, feeble in the female. Antennæ inserted near the base, the first joint almost reaching the eye. Thorax not quite as long as wide, sides moderately rounded behind the middle, slightly sinuate before the base, punctuation moderate but largely concealed by the vestiture. Elytra nearly twice as wide as the thorax, not more than one-fifth longer than wide, sides distinctly divergent to behind the middle, intervals apparently flat, much wider than the striae. Body beneath and legs densely squamose. Length 2 to 2.2 mm.

Hab.: California. Described from a single pair (type ♂) communicated by Mr. E. P. Van Duzee, taken at Coachella, Riverside Co., and a single specimen from Palm Springs (collected by Hubbard) erroneously placed with *varicornis* in my collection. The middle and hind tibiae of the male are armed at tip with a moderately long mucro which bears a denticle beneath. This species is to be associated with *propinquicornis* and *modestum*, the latter of which it should follow. It is much more densely and coarsely squamose than *modestum* and is withal a larger and stouter species. Superficially it more nearly resembles *propinquecornis*, but the latter has a finer and less dense vestiture and a slightly longer undilated beak with more basally inserted antennæ. Superficially also it resembles quite strongly the densely squamose form of *varicornis* which occurs in the same region, but this latter belongs to an entirely different section of the genus.

**A. *eccentricum* new species.**

Very similar in form, size, and general aspect to *griseum*. Black, pubescence conspicuous but not dense except on the sternal side pieces. Beak (♂) as long as the head and thorax, a little thicker at the middle as viewed from the side, slightly dilated at the antennal insertion, polished and sparsely finely punctate apically, more closely so at sides; ♀ longer than the head and thorax, a little more slender and scarcely dilated. Antennæ rather distant from the base of the beak, first joint subequal to the next three, the third attaining the eye. Front scarcely to feebly sulcate. Prothorax a little wider than long, sides arcuate medially, moderately constricted in front, sinuate before the basal margin, which is evidently expanded; punctuation rather close, basal fovea present. Elytra about one-third longer than wide, sides subparallel or feebly divergent basally in the male, more evidently diverging posteriorly in the female. Punctuation beneath moderate. Length 2 to 2.2 mm.

Hab.: Arizona (Santa Rita Mts., Clemence; Huachuca Mts., Slevin). The type is a male from the first named locality.

In addition to the sexual rostral differences, the males have the middle tibiae armed with a simple acute apical mucro, the front and



hind tibiae unarmed; the tibiae in the female are unarmed as usual and the femora are noticeably more slender than in the male.

The presence of a terminal mucro on the middle tibiae only is a unique character thus far in the genus, but it occurs again in the following species.

This species should follow *griseum*, and may most certainly be distinguished from it and allies by the peculiar male tibial armature.

**A. brunnicornis** new species.

Similar in most respects to the preceding species, notably so in having the middle tibiae alone of the male mucronate. It differs from *eccentricum* as follows. Size obviously smaller; beak shorter and stouter in the male, shorter than the head and thorax, and more evidently thickened medially when viewed in profile; antennae brownish testaceous, basal joint less elongate, the second joint reaching the eye; tibial mucro curved inward a little at tip, not so in *eccentricum*.

In the female the beak is also stouter, and is a little more strongly curved than in the same sex of *eccentricum*.

The femora are more slender in the female than in the male as in *eccentricum*.

Length 1.6 to 1.9 mm.

Hab.: Arizona. Chiricahua Mts. Collected by H. G. Hubbard.

This species is definitely separable from all others except the preceding by the peculiar male tibial armature and from that by the color of the antennae, in itself a very unusual character.

**A. eriogoni** new species.

Very closely related, and extremely similar to *ventricosum*, but averaging a little smaller, and slightly less ventricose than the latter. The pubescence is a little better developed than in *ventricosum*, and the beak is evidently longer and more slender, being as long as the head and thorax in the male, and a little more elongate in the female. The elytral interspaces are, as a rule, a trifle wider and flatter in *ventricosum*. Length 1.4 to 1.55 mm.

Hab.: Arizona. Described from two males and two females taken by Dr. E. A. Schwarz on *Eriogonum* at Oracle and in the Santa Rita Mts., June 5-30. The type a male from the first named locality.

*Ventricosum* occurs abundantly on *Prosopis* in the Southwest.

**A. frontellum** new species.

Moderately robust, black, with grayish aspect, due to the dull lustre and white appressed hairs which, though sparse, are somewhat conspicuous. Beak

(♂) shorter than the head and thorax, moderately stout, cylindrical, closely rather coarsely punctate almost throughout; (♀) scarcely as long as the head and thorax, a little longer and more slender than in the male, similarly sculptured. Antennæ moderate, basal joint not longer than the next two and almost reaching the eye. Front a little narrower than the tip of the beak, with lines of subconfluent punctures. Prothorax a little wider than long, narrowed in front, feebly constricted at apex, sides subparallel in basal half, very feebly sinuate before the basal margin which is only very slightly expanded; punctuation moderate.

Elytra scarcely one-third longer than wide, sides subparallel basally in the male, a little divergent to middle in the female intervals very little wider than the striae, distinctly convex. Metasternum and first two ventral segments coarsely punctured. Legs moderate. Length 1.8 to 2 mm.

Hab.: Texas. El Paso, June 7 (Knaus); Marfa, July 3-6 (Wickham). The type is a male from the first named locality.

There is no apparent sexual difference other than in the length of the beak. The species belongs in Sec. IV and should precede *subornatum*.

**A. perlentum** new species.

Subelongate, black, thinly pubescent, hairs feebly condensed at the base of the third elytral intervals. Beak rather stout, as long as the head and thorax (♂), distinctly longer (♀), cylindrical, moderately curved, not appreciably dilated at the antennal insertion, dull and moderately punctate throughout in both sexes. Front as wide as the tip of the beak (♀), slightly narrower (♂), not broadly sulcate but with one or two narrow striae. Basal joint of antennæ not quite twice as long as the second, the latter more than attaining the eye (♂) or not attaining the eye (♀). Prothorax about as long as wide, sides feebly arcuate in basal two-thirds, slightly narrower at base than at middle, basal margin not appreciably expanded. Elytra not quite twice as long as wide, humeri moderate, sides feebly divergent in basal half in male, more obviously so in the female, intervals more flat and nearly twice as wide as the striae. Beneath rather sparsely punctate; legs normal. Length 2.4 to 2.85 mm.

Hab.: California (Poway, San Diego Co.). Described from a single pair collected and contributed by Dr. Blaisdell.

If I have properly interpreted the sexes, there are no differences of a sexual nature other than in length of the beak.

If the front is held to be narrower than the tip of the beak, and it is slightly so in the male, this species would follow *filum* in Section IV of my Revision, but if it be not so considered, and it is not at all so in the female, then it would properly come after *elutipes*, where I would prefer to place it.

**A. disparatum** Shp.

Specimens taken by the late Prof. Snow in the Santa Rita Mts., Arizona, were so identified by Wagner. It should follow *nasutum* in my arrangement of species, judging from one example sent me by Snow.

**A. nunenmacheri** Wagner. *Novitates Zoologicae*, XIX, April, 1912, p. 97.

Specimens sent me by Nunenmacher show this to be not separable from *proclive* Lec.

**A. haplopus** Wagner, loc. cit., p. 99.

This is said to be near *ventricosum*, differing by its smaller size, lack of metallic lustre on the elytra, and especially by the shorter, more robust beak, and shorter, more robust antennæ and shorter elytra. Described from a pair from Benson, Arizona, sent by Nunenmacher. This must be near *erigoni* described above but the distinctive characters given do not especially apply and the beak in *erigoni* is really less stout than in *ventricosum*, instead of more so.

An appeal to Mr. Nunenmacher for a specimen of *haplopus* for study brought the reply that he had no more. It is unfortunate that a collector should send all his specimens of a doubtful thing like this to Europe, and especially so that it should be described there without depositing a paratype in this country. American entomologists have been put to no end of trouble in attempting to identify American insects described by European systematists, more often than not without any adequate representation of our species for comparative purposes. A like action on our part would be considered highly presumptuous, but it would really be much easier in normal times for an American student to get a working representation of the European species of almost any genus than for the European student to get an equally complete series of ours. If they continue to describe our species, the least they can do is to place types or paratypes in some available collection in this country.

## MISCELLANEOUS NOTES.

**Guenée's Herminidæ revived.**—I have been studying at odd times recently the basal abdominal and thoracic structures of the Noctuidæ. At present my conclusions are still amorphous in most of the series but a group of the Deltoids stand out strongly in contrast to all the other Noctuidæ, in having the first abdominal spiracle exposed on the edge of the tympanic hood, as noted in my description of the Arctiidæ, etc. (*Psyche*, 23, 186, 1916), while in all others, including the Hypenid Deltoids it is enclosed within the hood wherever any hood is developed. This Arctioid group is approximately the Herminidæ of Guenée, or the Heliini plus Herminiini of Smith, and may be known as the Herminiinæ. It includes the following genera:

<i>Camptyllochila</i> Steph. ( <i>Epizeuxis</i> auct.),	<i>Tetanolita</i> Grt.,
<i>Pseudaglossa</i> Grt.,	<i>Phalænophana</i> Grt. ( <i>Heterogramma</i> ),
<i>Epizeuxis</i> Hbn. ( <i>Zanclognatha</i> Led.),	<i>Hypenula</i> Grt.,
<i>Hormisa</i> Wlk.,	<i>Lascoria</i> Wlk. ( <i>Gaberasa</i> Wlk.),
<i>Philometra</i> Grt.,	<i>Rejectaria</i> Gn.,
<i>Phalænostola</i> Grt.,	<i>Palthis</i> Hbn.,
<i>Chytolita</i> Grt.,	<i>Dercetis</i> Grt.,
<i>Renia</i> Gn.,	<i>Herminia</i> (Europe),
<i>Bleptina</i> Gn.,	<i>Nodaria</i> (Europe),
	<i>Pechypogon</i> (Europe).

Numerous South American genera evidently also belong here,—all those with modified fore legs and perhaps a few others, like our *Camptyllochila* and *Pseudaglossa*. The following genera are certainly excluded:

<i>Scoliopteryx</i> ,	<i>Rivula</i> ,	<i>Menopsimus</i> ,
<i>Plusiodonta</i> ,	<i>Mycterophora</i> ,	<i>Capis</i> ,
<i>Sylectra</i> ,	<i>Pleonectyptera</i> ,	<i>Salia</i> ,
<i>Hypsoropha</i> ,	<i>Phytometra</i> ( <i>Prothymia</i> ),	<i>Bomolocha</i> ,
<i>Alabama</i> ,	<i>Pangrapta</i> ,	<i>Lomanaltes</i> ,
<i>Anomis</i> ,	<i>Spargaloma</i> ( <i>Hyamia</i> ),	<i>Ancpischetos</i> ,
<i>Scolccocampa</i> ,	<i>McIanomma</i> ,	<i>Plathyphena</i> ,

<i>Pseudorgyia</i> ,	<i>Dyspyralis</i> ,	<i>Hypena</i> ,
<i>Gabra (Eucalyptra)</i> ,	<i>Metalectra (Homopyralis)</i> ,	
<i>Parora</i> ,	<i>Hyphenopsis</i> ,	

W. T. M. FORBES.

**Liophloeus tessulatus** Müller.—A specimen of this European insect was received in December, 1917, from New Rochelle, accompanied by the statement that: "In winter it eats the roots (green-houses) and in summer the leaves of *Rhododendron* and *Taxus*." Only one specimen was obtained and the recorded food habits lead us to suspect that most of the damage in this greenhouse may have been caused by the somewhat similar appearing black vine weevil, *Otiorynchus sulcatus* Fabr., another European species which has been received from several New York State localities. Fowler, in his "Coleoptera of the British Islands," 5: 198, states that *Liophloeus* occurs on hedges, young trees, nettles, etc., and may be obtained by beating ivy which seems to be the special food plant.—E. P. FELT.

**Nemobius**.—The name of the genus *Nemobius*, Chapuis 1869 in Scolytidae has been altered to *Nomcbius* by Longinos Navas because *Nemobius* was first used in Orthoptera (Serville, 1839). The alteration appears in Boletín de la Soc. Aragonesa de ciencias nat., XIV, 1915, p. 34, and is liable to be overlooked.—JOHN D. SIEMERMAN, JR.

**Extract from Letter of Dr. David Sharp re Rhynchophorus palmarum**.—Just now I am giving much attention to Calandridæ. I see that in your nice book you have been unable to give information about *Rhynchophorus palmarum* in North America. I can give information about this and will do so as it involves several points of considerable importance. Upwards of fifty years ago, the late Edwin Brown, G. R. Crotch and myself contributed to sending a young collector, J. R. Hardy, to California to get beetles for our collections; and it fell to me to arrange and name what we received. I could only do this by sending a set to Dr. Leconte, which I did, giving him permission to keep whatever he liked. Among them was a unique specimen of a large black *Rhynchophorus* which he said was *R. palmarum*, but expressed the opinion to me that it was not N. American but had got into the lot by some error.

Enquiry of Hardy showed that it was certainly not an error. He did what at that time was a marvel, viz.: penetrated on foot from San Diego to Fort Yuma, and found this specimen in a grove of palm trees there. Leconte was quite satisfied and so *R. palmarum* was placed in your lists. But is the specimen really *R. palmarum*? I doubt it. I find that *R. palmarum* is a different genus from the Asiatic *Rhynchophorus*, and so far as I can judge from your book (I have no specimens) your *R. cruentatus* agrees with the Asiatic forms, and not with *R. palmarum*. It would be worth while to have the specimen examined as it is probably still extant in the Leconte collection. *R. palmarum* instead of having the pronotum simply curved at the base, is sinuate on each side there, so as to be lobed in the middle, and it has the rostrum extremely coarsely sculptured at the base beneath, while it is smooth in the other species. I may add that I have an idea from your book that *R. cruentatus* may be a different genus from the Asiatic *Rhynchophorus*.—D. SHARP.

**Tandem Dragonflies.**—At one of the smaller ponds close to Long Pond, Wading River, Long Island, N. Y., on July 26, 1917, the writer saw a most unusual sight, namely three dragonflies attached and flying together. The species was the common *Gomphus lividus* Selys (*sordidus* Hagen). First there was a male, which was holding another male just behind him by the prothorax, this male in turn being in copulation with a female of the same species. The three insects were flying together along the margin of the pond and were easily captured. On one occasion on Staten Island we saw a male *Libellula luctuosa* (*basalis*) seize a female *auripennis*, and at another time a male *auripennis* grasp a female *L. semifasciata*, but never before had we witnessed three dragonflies flying tandem.

Long Pond and the nearby Deep Pond are among the best localities for dragonflies on Long Island, and at the time of our visit in June, 1917, we captured at the former such desirable species as *Lestes eurinus*, *Enallagma minusculum*, *Gomphoides obscura*, *Anax longipes*, *Dorocordulia lepida*, *Ladona exusta deplanta*, *Libellula flavida*, *Celithemis monomelana*, while at the latter were taken *Dorocordulia libera* and *Leucorrhinia frigida*. Some of the species mentioned are common in the Pine Barrens of New Jersey, but rare on Long Island.—WM. T. DAVIS.

**Hapithus agitator Uhler.**—Several specimens of this species were collected at Ocean Beach, Fire Island, Long Island, N. Y., August, 1917, by Mr. Henry Thurston. This species is an addition to the known fauna of Long Island and its range has thus been extended northward. A female of this cricket was collected on Staten Island at Tottenville, September 21, 1902.—WM. T. DAVIS.

**Papilio marcellus Cramer.**—A specimen of this species alighted on my office window in the Grand Central Station Building, 42d street, New York City, on the eighth of last July.—C. H. SUNDERLAND.

**The Honey-dew of Aphids very Attractive to Moths and Roaches.**  
—On June 27, 1917, the writer was walking at night along a road near Wading River, Long Island, N. Y., examining the wayside vegetation with an acetylene lantern, when suddenly a small bush was seen to be aflutter with moths. The bush proved to be a species of *Pyrus*, the terminal branches of which were infested by a species of black or blackish aphid. The excrement of these creatures was very attractive to scores of other insects, probably more so than the usual "sugar" bait used by entomologists. In all 45 moths were taken of 24 species, but a number of kinds escaped, and no especial effort was made to collect all of the specimens seen, in fact it would have been impossible, for they were most wary and quickly left the bush. Geometrids and microlepidoptera were present, as well as Noctuids; also roaches of three species, and numerous caddis flies. By visiting the little bush the next evening and approaching more cautiously, some of the species were collected that got away on the first occasion.

The insects identified are as follows: Moths; *Rhynchagrotis rufipectus*, *Noctua plecta*, *Mamestra detracta*, *M. subjuncta*, *M. grandis*, *M. renigra*, *Heliophila multilinea*, *Orthodes crenulata*, *O. cynica*, *Graphiphora oviduca*, *Ogdoconta cincreola*, *Eustrotia carneola*, *Prothymia semipurpurea*, *Tarache crastrionides*, *Pangrapta decoralis*, *Phoberia atomaris*, *Orthofidonia vestaliata*, *Sciagraphia heliothidata*, *Caberodes confusaria*, *Sabulodes lorata* and *Desmia funeralis*. The three roaches are *Parcoblatta fulvescens*, *P. virginica* and *P. uhleriana*. Not only were there many male roaches present, but also a number of females, which in this genus are wingless.—WM. T. DAVIS.

**Anacampsis innocuella.**—In connection with this species and Mr. Davis' note in the June, 1918, number it may be well to record the following observation. In June, 1912, I found large numbers of rolled leaves of *Populus grandidentata*, and a good many of *P. tremuloides*, lying on the ground as described by Mr. Davis, and bred this species from them. In this case they were evidently cut off long before maturity, often very soon after the last molt, and the caterpillar fed for several days on the withered and partially decayed leaves. The localities were Mt. Toby, Sunderland, and the Notch, Mt. Holyoke Range, Mass. I have found it many times since, here at Ithaca and elsewhere.—WM. T. M. FORBES.

**Butterfly Collecting for the Season of 1918.**—Spring collecting was very poor and the season apparently backward. The poor collecting at Greenwood Lake on May 5 has already been reported.

Early summer, *i. e.*, June collecting, was very good and the season was ahead of normal. At Fort Montgomery, N. Y., on June 1, the collecting was excellent, 30 species and 2 varieties being positively identified; there were 2 or 3 additional forms which escaped. Insects of other orders were apparently plentiful.

Summer cottages are being erected and encroach on the collecting territory. Military guards are all through the region: they examine the autos but do not molest the pedestrians.

Several trips to Van Courtlandt Park, New York City, through this month showed good collecting, but there was a decided falling off during the last few days.

From the last days of June to the present time, the collecting has been poor and the season backward, at least during July. On the other hand the vegetation was ahead, golden rod and iron-weed being in bloom two to three weeks earlier than during normal seasons. Perhaps the extremely dry weather during July and August is responsible.

*Eurymus philodice* (Godart), which was quite scarce last season, is with us this year in its normal abundance.

The remarks on the poor collecting seem also to apply to the Heterocera.

Lepidopterous larvæ, so abundant last fall, are relatively scarce now.—FRANK E. WATSON.



## PROCEEDINGS OF THE NEW YORK ENTOMOLOGICAL SOCIETY.

## MEETING OF APRIL 2.

A regular meeting of the New York Entomological Society was held April 2, 1918, at 8:00 P.M. in the American Museum of Natural History, President L. B. Woodruff in the chair, with 16 members and four visitors, including Dr. Edwin C. Van Dyke, present.

Upon invitation by the chairman, Dr. Van Dyke spoke of certain taxonomic matters he had noticed and generally of the interesting modifications of beetles found in a few special environments. He pointed out in particular that the W. I. *Acmaodera* found in South Florida is *cubecola* and not *pulcherrima* as it is commonly labelled, illustrating his remarks by showing the specimens, the original descriptions and the figures given by Kerremans.

He exhibited also a blind cave beetle collected near Austin, Texas, in March, 1903, by Prof. Comstock, which is undescribed and especially interesting because allied to *Casnonia* instead of *Anophthalmus*.

In this connection Dr. Van Dkye spoke of the terricolous fauna of California, exhibiting *Pterostichus caligans* Horn and related undescribed species, pointing out their pallid color and restricted habitat; also of the interesting association of certain species with *Neotoma* the bush or wood-rat. He referred also to the intertidal habitat of the aberrant species of *Trechus* found on the Pacific Coast, saying a new genus would eventually be needed for such between *Trechus* and *Pogonus*.

Several new species of *Cychrini* allied to *subtilis* were also shown.

His remarks were discussed by several members.

Mr. Barber read a paper on "New Species and Varieties of Chinch-Bug from the United States" with blackboard illustrations and diagrams to show the dispersal routes suggested by Webster. This paper will be printed in full.

Mr. Watson exhibited recent donations received from Mr. B. Preston Clark, of Oberthür and also Argentine butterflies and read a paper, "Miscellaneous Notes and Records of Local Lepidoptera," which will be printed in full.

Mr. Notman exhibited a box of Coleoptera collected March 31 at Chauncey, Westchester Co., N. Y., pointing out a number of interesting species included.

Mr. Dow exhibited and donated to his fellow members a number of beetles and other insects collected March 31 at Claremont, N. H.

## MEETING OF APRIL 16.

A regular meeting of the New York Entomological Society was held at 8:00 P.M., April 16, 1918, in the American Museum of Natural History, President Lewis B. Woodruff in the chair, with twenty members and three visitors, including Mr. F. G. Carnochan, present.

The Field Committee through Mr. Dow reported that seven members took part in the excursion to Central Park, L. I., where the capture of *Brephos infans* was the feature of the occasion.

Mr. Engelhardt spoke of the "Faunal Zones in S. W. Utah," saying in part that they were governed by the elevation and cañons and exceedingly varied. Primarily three zones, Virgin River Valley at about 3,000 ft., Great Basin at about 5,000 ft., High Plateau at about 10,000 ft., might be distinguished. But the cañons act as arms of the more elevated zones; the vegetation of which will descend to even 3,000 ft. in the cañons; and an intermediate region at 6,000/7,000 ft. may be less distinctly distinguished, as well as another at 4,000/5,000 ft.

After speaking of the trees and animals that inhabit each zone, Mr. Engelhardt exhibited the tiger beetles as an example of insect distribution: Virgin River Zone: *Cicindela prertextata, arizonæ*; Transition Region: *Cicindela kirbyi, oregona* (green form); Great Basin: *Cicindela tenuisignata, parowana, chihuahuæ, oregona* (black form); High Plateau; *Cicindela longilabris, cimarrona*, and a form of *longilabris* from Duck Lake and Cedar Mts.

Mr. Englehardt also exhibited from the Hymenoptera he had taken *Polistes flavus, Bombus Morrisoni, Xylocopa arizonensis* and *tabaniformis*, the latter crepuscular in habit, and spoke of previous collecting in the same region by Wickham (1904), Weidt (1900), and particularly Lieut. Wheeler's U. S. Geol. Survey, 1871-1874, which turned up some species like *Satyrus wheeleri, Argynnis nokomis* and *Sphinx elsa*, that remain very rare. These species were also shown and caused Mr. Engelhardt to close with an enthusiastic praise of a region so varied in character and so promising as a field for future work.

Mr. Nicolay exhibited a collection of syrphid fleas and read a memo. on the lunate onion fly which will be published elsewhere.

Dr. Bequaert also exhibited Syrphidæ, calling attention to a number of special interest including the different color of the hairs noticed in a California specimen of *Arctophila flagrans*. The allied European species is, however, very variable in color. Others spoken of were *Criorhina humeralis* Will. from Yaphank, L. I. (Mr. Engelhardt), *Xanthogramma æqualis* Loew, Catskill, N. Y., *Brachypalpus rileyi* Will., Staten Island (Mr. Davis), and Red Bank, N. J., *Chrysotoxum ventricosum* Loew, Keene Valley, N. Y. (Mr. Notman), *Sphiximorpha loewii* (Williston), Fort Grant, Ariz. Seven species of *Microdon* were shown, including the true *M. baliopterus* Loew from Texas. Specimens from Petersburg, Va., were at first believed to be *M. baliopterus*, but the specimens caught on the Cornell auto trip at both localities showed the difference; the Virginia species is probably undescribed.

Dr. Bequaert also exhibited a crepuscular bee of the genus *Ptiloglotta* taken at San Juan, Porto Rico, and received through Mr. Engelhardt.

Mr. Halinan spoke of the countries into which his engineering work had taken him since his last attendance, including Panama, where the rich tropical fauna had enabled him to collect great numbers of insects; and Chile, where

in the semi-arid regions about Coquimbo and in the nitrate deserts he had found it hard to gather about 2,500 specimens. The best opportunities for collecting were around the small rivers and in the scattered cases, but some insects were also found on cactus blossoms, at the arc light and in the tarantula holes, though the latter were seldom perfect.

He also spoke of the efforts made since his return to dispose of the Sleight Collection in connection with the establishment of a public museum in Paterson, and present prospects of their success.

Mr. Carnochan, being invited to speak by the president, said that he had been able to do little in entomology since August, when he entered the Army, but he was glad to report receipt of a letter from Prof. Wheeler, detailing the success of the students at the Bussey Institution.

Mr. Bischoff placed on record the capture by Mr. Barber, at Vienna, Va., August 11, 1916, of a specimen of *Neoclytus jouteli*. This longhorn was described by Mr. Davis from Lakohurst, N. J., and has since been known mainly from specimens beaten from post oak in New Jersey and by Mr. Bischoff.

Mr. Davis exhibited *Cimex vicarius*, a hairy bed bug from the nests of cliff swallows at Yarmouth, Nova Scotia, collected at his request by Mr. Harrison F. Lewis on July 29, accompanied by other species for comparison.

Mr. Dow exhibited insects from under stones and beetles recently collected which he placed at the disposal of his fellow members.

Mr. Comstock exhibited Monthly Bulletin of the California Development Board for March, 1918, containing a report on "Harvesting a Most Unusual Crop," viz.: 60 to 75 billion lady bugs, which are packed in quarts = 33,000 lady bugs, stored until summer, and then shipped to growers of cantaloupes and other vegetables to feed on the injurious aphids.

#### MEETING OF MAY 7.

A regular meeting of the New York Entomological Society was held at 8:00 P.M., on May 7, 1918, in the American Museum of Natural History, President Lewis B. Woodruff in the chair, with 19 members and three visitors present.

Mr. Davis read a paper, "Collecting Notes from Virginia," and exhibited several boxes of the insects referred to therein. The larva and cocoon of *Dynastes tityus* from roots of black oak showed how varied was its food, for it has also been found by Manee in pine roots and by others in ash. A large number of beetle elytra, etc., from toad excrement showed that *Cychnus*, *Dicelus*, *Geotrupes*, *Elater*, *Charidium*, *Allorhina*, *Meracantha*, *Hippodamia*, *Pterostichus* were among the genera contributing to the toad's food. A great series of the genus *Calopteron*, all bred from one bunch of larvæ, will be the basis of a later article on the confused varietal names.

Among other interesting beetles were *Coptodera ærata*, *Pyrota lineata*, *Ludius attenuatus*, all uncommon in local collections, and *Arthromacra robinsoni*, named in honor of Col. Wirt Robinson, who was Mr. Davis' host and companion in Virginia.

Among other insects shown from Wingina, was a *Mantispa brunnea* Say.

In this connection Mr. Davis exhibited specimens of *Mantispa interrupta*, *Mantispa floridana*, *Mantispa sayi* and *Mantispa viridis*. He called attention to the synopsis of the species by Nathan Banks in the Trans. Am. Ento. Soc., February, 1897, and stated that some of the specimens of *M. brunnea* in his series of forty-six individuals had the "anal vein furcate in fore wing"; some had it furcate on one side only and in others it was simple in both wings. He stated that he had compared his four specimens of *M. floridana* with the type in Mrs. Slosson's collection and found them to be alike except that in the type the anal vein is furcate in fore wings, while in the other four it is simple.

Dr. Bequaert exhibited three flies, new to New Jersey List, that had been collected by Mr. Nicolay, viz.: *Helophilus bilinearis* Williston, Secaucus, N. J., April 17; *Myiolepta nigra* Loew, Huntingdon Co., N. J., April 19; *Chrysochlamys buccata* Loew, Malaga, N. J., April 26; of which the first had been described from Colorado.

Dr. Bequaert also presented a paper on "Maggots of Flies Parasitic on Birds" which will be published later. He referred to the early work of Leon Dufour and other authors, commending especially Albert F. Coutant's paper in Journal of Parasitology, 1915, on "The Habits, Life History and Structure of a Blood Sucking Muscid Larva." His remarks referred especially to *Protocalliphora sordida* (Zetterstedt) the species whose maggots live in the feathers and suck blood at intervals, whereas *Protocalliphora azurea* (Fallen) maggots bore in the skin of young birds and usually kill them in a short time.

Mr. J. A. Weber, of the Linnæan Society, present as a visitor, inquired about the flies parasitic on owls and Dr. Bequaert explained that they belonged to a different group, Ornithomyidæ, with spherical larvæ, mistakable for eggs.

Mr. Woodruff exhibited *Cremastochilus* found flying about ant hills at Greenwood Lake, N. J., on May 5, as will be published in Miscellaneous Notes.

Mr. Davis referred to *Euphoria inda* L., saying that six individuals were found on the same nests of *Formica exsectoides* at Greenwood Lake on May 5, 1918, and the ants were pulling them about in the same manner as they do *Cremastochilus*. All six were alive and active when let alone by the ants. In one instance a male and female were found together.

Mr. Davis also contributed a note on *Alypia octomaculata* Fab. A male collected May 5, 1918, near Greenwood Lake, N. J., was shown. Mr. Woodruff had also collected a specimen at the same time. Mr. Davis called attention to the discussion in the Journal for June, 1917, p. 147, as to whether this species was double brooded, and stated that as several specimens had been captured early in the year, there was every reason to suppose that it was double brooded at times.

In further reference to early dates for Lepidoptera, Mr. Davis exhibited *Papilio turnus* L. Two males were seen, one of which was captured on top

of the Palisades, N. J., April 24, 1918, while in company with Dr. Wiegmann. This is quite an early date.

Mr. Woodruff spoke of a faded Monarch butterfly seen in Central Park on April 28.

Mr. Dow exhibited *Cremastochilus* taken at Fort Lee.

#### MEETING OF MAY 21.

A regular meeting of the New York Entomological Society was held at 8:15 P.M., May 21, 1918, in the American Museum of Natural History, President Lewis B. Woodruff in the chair, with 17 members and one visitor present.

Mr. Bird read a paper on "The Decline of the Hickory Bark Beetle, *Scolytus quadrispinosus*," in which the operations of nature by which the balance is restored between an indigenous food plant and its enemies were traced. The paper will be printed in full.

It was discussed by Messrs. Dickerson, Woodruff, Davis, Engelhardt and Olsen, especially in reference to the rise and fall in the severity of insect attacks.

Mr. Woodruff read a paper on "Our Local Species of *Ophiderma*," in which two new species were described and all the species were discussed. This paper will also be printed in full.

Mr. Harris recorded the fact that of *Omus vandykei* the only known example was in the W. Horn collection in Berlin. The specimens distributed under that name are the most up-country form of *Omus cupreonitens* and come from Dyerville in Humboldt Co., Cal., about 75 miles southeast of Arcata Beach, the type locality for *cupreonitens*.

Mr. Davis exhibited a list of Long Island Longhorns which he had compiled for Mr. Nicolay from his many trips on the island. He called particular attention to the records for *Elptroleptus floridanus*, beaten from *Quercus nana* at early dates and found also in washup at Rockaway. This species extends even to Massachusetts.

Mr. Davis also exhibited beetle remains from skunk excrement, consisting largely of three species of *Carabus*, *serratus*, *vinctus* and *limbatus*.

Mr. Engelhardt recalled also finding remains of *Cychrus elevatus* in raccoon excrement.

Mr. Leng exhibited Chilean Coleoptera collected by Eduardo Varas Arangua.

Mr. Mutchler exhibited *Adelocera mexicana* Cand. collected by Dr. Lutz in Baboquivari Mts., Arizona, in August, 1916, identified by Dr. Van Dyke.

Mr. Comstock spoke of the deleterious effect on mules of mosquito bites, half the quantity of feed sufficing when they were protected from the insects.

Messrs. Davis and Engelhardt spoke of good results of drainage ditches and damage thereto by recent high tides.

Mr. Woodruff spoke of his recent visits to Washington and Ithaca and conveyed greetings to the members from Messrs. Schwarz, Barber, Knight, Forbes, Needham, Kennedy and Funkhouser.

Dr. Bequaert spoke of insects used as food by African natives, mentioning especially caterpillars and termites as a regular diet, the latter usually sold in the markets; he spoke also of the extraordinary clouds of small midgits (*Corethra*) observed at Lake Nyassa and also used as food and of the occasional use of grasshoppers and longhorn larvæ. The methods of capture and preservation, mainly by smoking, and of cooking were described and the flavor extolled. Termites were said to resemble in flavor lobster salad mixed however with sand if their wings had been imperfectly removed.

#### MEETING OF OCTOBER 1.

A regular meeting of the New York Entomological Society was held at 8:15 P.M., October 1, 1918, in the American Museum of Natural History, President L. B. Woodruff in the chair, with eleven members and one visitor present.

The Librarian reported his completion of the segregation of the signatures that are part of our stock of Journals.

Mr. Watson moved the investment of \$200 in Fourth Liberty Loan. Carried. Mr. Davis and Dr. Bequaert signified their intention of becoming life members, to partly meet such investment.

Mr. Barber moved to add the bonds purchased under Mr. Watson's motion to the Permanent Fund. Carried.

Mr. Leng gave an account of a recent visit with Mr. Davis to Washington and conveyed the compliments to the Society of many of the entomologists they met there, including Messrs. Schwarz, Barber, Fisher, Mann, Chittenden, Caudell, Casey, Crawford; also Popinoe and Wickham, who happened to be visiting the National Museum at the same time.

In a discussion of the desirability of numbering the species in the new Check List, invited by Mr. Leng, the affirmative view appeared to prevail.

Mr. Olsen exhibited *Bruchus calvus*, which he had found abundant at Wood's Hole, Mass., and its food plant *Cytisus scoparius*, identified by Mr. Davis. The plant is introduced from Europe and commonly known as broom. Mr. Engelhardt spoke of a colony of the plant at Richmond Hill, L. I. Mr. Leng mentioned that Dr. Morgan had also found the *Bruchus* at Wood's Hole.

(In Kleine's paper on "Die Lariiden und Rhynchophoren und ihre Nahrungspflanzen" (Ent. Bl., 1910, pp. 4-12) the European *B. villosa* Fab. (*atra* Marsh and *cisti* Payk.) is said to live on *Sarothamnus* (*Cytisus*) *scoparius*, and it is therefore possible that our species is identical and an introduction.)

Mr. Sherman spoke of his visits to Boston, where the hatching of beetles from the trees in the bear group, prepared by Dr. Johnson and the preserva-

tion of the spiders with inflated abdomens by Mr. Emerton, still good after forty years, excited his interest; and to Brunswick where the disposition of Dr. Packard's library became known to him, part of it being in Bowdoin and part in Brown University.

In the discussion of his remarks by Messrs. Davis, Olsen and Engelhardt, Mr. Leng stated that Mr. Schwarz has emphasized the importance of saving cast skins of Coleopterous larvæ, which often showed the mouth parts better than alcoholic preparations.

Mr. Dow spoke of the wholesale destruction of *Cynthia* cocoons by the intense cold of last December. Messrs. Engelhardt, Bell and Woodruff corroborated his statements, Mr. Engelhardt attributing the damage to wet and cold combined. All agreed that the moth was scarce this season as a result.

Mr. Engelhardt exhibited a living walking stick insect from Setauket, L. I., which Mr. Davis said might be *Manomera blatchleyi*, though in the absence of the two sexes, identification remained doubtful.

Dr. Bequaert exhibited nest of *Bombus separatus* and bumble bees therefrom, collected at Orient, L. I., from the inside of a log lying on the beach. He referred to Putnam's paper in Proc. Essex Inst., Salem, Mass., 1864, "On the Habits of some species of Bumble Bees" and to later papers in the Annals of Ent. Society of America. Many mites were found in the nest but no other parasites. A specimen of the beetle *Mezium gibbum* was found in the nest later. The habit of the male of an allied *Bombus* to hover long about the bushes was also mentioned.

Mr. Bell exhibited collections of grasshoppers, cicads, etc., made during the summer.

Mr. Watson exhibited for Mr. Bell Hesperidæ captured by the hemipteron *Phymata erosa* and read a note on butterfly collecting for the season of 1918 which will be printed in full.

Mr. Davis read a note on *Anacamptis* by Dr. Forbes and one on *Hapithus* by himself, which will also be printed in full. He also exhibited a number of photographs of Plummer's Island, donated by Mr. Clarence Shoemaker to the Society's album.

Mr. Woodruff spoke of his excursion to the Catskills, where he met Messrs Shoemaker and Davis and made many captures of northern insects.

#### MEETING OF OCTOBER 15.

A regular meeting of the New York Entomological Society was held at 8:15 P.M., on October 15, 1918, in the American Museum of Natural History, President L. B. Woodruff in the chair, with seventeen members and one visitor, present.

The Treasurer reported that he had purchased two \$100 Liberty Bonds as instructed, Nos. 527199/200 and added same to the Permanent Fund. He also reported that Dr. Joseph Bequaert and Wm. T. Davis had qualified as life members by payment of \$50 each.

The President announced that they had become life members thereby.

Mr. Ernest Neilson, c/o C. E. Olsen, Maspeth, N. Y., was elected an active member.

Mr. Fred M. Schott, 854 Bushwick Ave., Brooklyn, N. Y., was nominated for membership by Mr. Burns, seconded by Mr. Dow. On motion by Mr. Dow, the by-laws were suspended and Mr. Schott was immediately elected an active member.

Letters were read from A. S. Nicolay, referring to his life at Camp Upton, and from H. H. Brehme, announcing the loss of his effects by the explosion at Morgan, N. J.

A note from Dr. Felt, referring to the introduction of a European weevil, was referred to the Publication Committee.

Mr. Leng read a paper on "The New Check List of Coleoptera," exhibiting the manuscript and explaining the methods of compilation. He also reviewed the alterations in the Leconte classification that have been proposed and distributed copies of the sequence of families that seemed desirable in accordance with such of those alterations as appeared to be well founded.

Mr. Notman exhibited a large box of beetles found at Moores', Clinton Co., N. Y., 280 ft. elevation, and close to the Canadian border, saying that the boreal element appeared to be less in evidence there than in the Adirondacks.

Mr. Hall exhibited butterflies from Sussex Co., N. J., found on May 26, commenting upon the great numbers seen in that early part of the season. One was new to the New Jersey list, viz.: *Amblyscirtes samoset* Scudd.

Mr. Barber exhibited a box of ground ginger from his home, in which a large number of the drug store beetle, *Sitodrepa panicea*, had developed. He also spoke of his collecting experiences in Virginia during August when the hot, dry season proved unfavorable.

Mr. Davis exhibited a portrait of our former president, Mr. C. F. Groth, in "The Guide to Nature" for August, 1918, with an account of the last meeting of the Agassiz chapter in which Mr. Groth was interested. He recalled the meetings held about 1902 in the cellar of Mr. Miller's house, 141 E. 40th St., where Mr. Groth then lived.

Mr. Davis also called attention to the humorous entomological references in a pamphlet called the "War Garden Guyed."

Mr. Schott exhibited insects found at Rockaway Beach, October 12, including *Solubea pugnax* and other Pentatomids and *Lebia bivittata*.

Mr. Leng exhibited Bull. No. 14 of the Canadian Dept. of Agr., containing Dr. Swaine's "Canadian Bark Beetles" with a complete classification, account of habits and abundant illustrations of unusual merit, the latter being by Mr. A. E. Kellett.

#### MEETING OF NOVEMBER 5.

A regular meeting of the New York Entomological Society was held at 8:15 P.M., on November 5, 1918, in the American Museum of Natural History, Mr. E. L. Dickerson in the chair, with ten members present.



Mr. Leng submitted a paper from Dr. David Sharp on "Studies in Rhynchophora, VI, The New York Weevil," which was referred to the Publication Committee.

Mr. Notman exhibited 1,336 specimens of Coleoptera, representing 163 species, collected by himself August 22-30 at Cochrane, Ontario, a new settlement and railroad station in the Timiskaming district, 911 ft. elevation, and about 70 miles from Hudson Bay. The region had once been swampy and heavily forested with balsam, larch and poplar (or birch on the sandy ridges) but has been badly burned by the settlers. Large patches of the original forest remain on either side of the road a half mile south of the station; and there are five small ponds nearby, so surrounded by swamps as to be difficult of access. One very small pond yielded many waterbeetles and, along its edges, also many Carabidæ and Staphylinidæ. North of the station for three or four miles there was nothing but burned forest and settlers' fields. Tiger beetles in four species were abundant on the roads and a patch of decaying toadstools was very productive, but the sweeping was poor and the beating, on account of dense swamps, almost impossible. The general result, although the vegetation was distinctly more northern than that of the Adirondacks, particularly in the absence of a varied deciduous forest was a collection duplicating in great part, that made by Mr. Notman during several recent years near Keene Valley, N. Y. Perhaps 10 per cent. of the species were different, six seemed to be undescribed and five, viz.: *Hydroporus acutangulus* Thoms. (very near *glabrinsculus* Aubé), *Colpodota aterrima* Grav., *Atheta euryptera* Steph. (previously reported from Pennsylvania and California), *Atheta nigritula* Grav. (previously reported from Long Island, Pennsylvania, West Virginia and California), *Olophrum consimilis* Gyll., appeared to be identical with European species, and except as reported by Bernhauer (D. E. Z., 1906, p. 348, and 1907, p. 392) additions to our fauna. The entire collection, comprising many very small species, was exquisitely mounted and carefully identified and was greatly admired by the members.

Mr. Harris exhibited Cicindelæ collected in the White Mts., N. H., including the following species, viz.: *C. duodecimguttata*, common on roads; *C. repanda*, common on sandy patches; *C. sexguttata*, rare on mountain patches; *C. purpurea*, not common on northern slopes but more so on southern; *C. generosa*, not common on gravel bank at Conway in June. A specimen taken at Guildhall, Vermont, was also shown as illustrating perhaps the most northern locality for this species. *C. punctulata*, sparingly found late in August. *C. longilabris*, often found with *ancocisconensis*; less heavily marked than Canadian specimens. *C. tranquebarica*, not as black as New Jersey specimens, but less brilliant than var. *horiconensis*. *C. limbalis*, not actually collected in New Hampshire, but known from Quebec and Vermont. *C. patrucla*, not actually collected in New Hampshire, but known from Burlington, Vt. *C. ancocisconensis*, described from Conway in 1852 by T. W. Harris.

In reference to the last, Mr. Harris said he had taken special pains to

ascertain its range and could now state positively that it occurred on the watershed of the three rivers draining the White Mts., viz.: the Saco, Androscoggin and Connecticut. The type locality was on a tributary of the first and he had found it also on the Ellis River, another tributary. Two years ago he had found it on the Israel River, a tributary of the Connecticut; and this year he had found it on the Peabody River, a tributary of the Androscoggin, between Gorham and Pinkham Notch, also east of Gorham on the Androscoggin itself. Sandy stretches by the river bank are its favorite haunt, but it is occasionally found on the automobile roads.

Mr. Harris said his collecting was between 1,300 and 2,000 ft. elevation, but some species, *sexguttata* especially, would doubtless occur at greater elevations. Mr. Sherman said he had found one *longilabris* at Lake of the Clouds, and Messrs. Davis and Shoemaker said that on Whitefast Mt. it occurred all the way to the summit. In reference to the scarcity of *punctulata*, Mr. Notman said it was abundant at the lower elevations, as at Crown Point, N. Y.

Mr. Harris closed by speaking of the good prospects for tiger beetles along the Connecticut River.

Mr. Davis exhibited some interesting Staten Island Lepidoptera, including *Papilio turnus* and *glaucus* with two intermediate specimens, one caught by Mr. Burns, August 18, at Fort Wadsworth, the other by himself, August 16, at Watchogue, and a very small specimen caught May 13, some years ago, by Mr. Leng. He also exhibited a series of *Epimecis virginaria* including examples, male and female, of the dark form *carbonaria*.

Mr. Mutchler exhibited volumes 20-26 of Marseul's "L'Abeille," calling attention to the valuable bibliographies it contained, covering the work of 72 of the older authors in even more complete detail than Hagen.

Mr. Shoemaker exhibited the dark form of *Phyciodes pharos*, caught in the Catskill Mts.

Mr. Schott mentioned the capture of *Carabus sylvosus*, October 12, in a potato lot at Half Way Hollow Hills, Long Island.

Mr. Sherman exhibited the first page of the new Check List just received from the printers as a sample of type, etc.

#### MEETING OF NOVEMBER 19.

A regular meeting of the New York Entomological Society was held at 8:15 P. M., November 19, 1918, in the American Museum of Natural History, President L. B. Woodruff in the chair, with sixteen members and one visitor present.

Mr. L. R. Reynolds, of Brockton, Mass., and Sergeant Wm. B. Richardson, of Richmond, Va., were proposed for active membership by Messrs. Davis and Sherman.

A letter from Col. Thos. L. Casey, mentioning the forwarding of 25 copies of Memoirs VIII to the members interested in Coleoptera, was read.

A letter from Lieut. James P. Chapin was read by Mr. Davis conveying greetings from France.

Mr. Howard Notman presented a \$100 Liberty Bond to the Permanent Fund of the Society.

On motion by Mr. Davis, seconded by Dr. Lutz, Mr. Notman was elected a life member and thanked for his gift.

Mr. Wm. T. Davis gave a short account of his visit to Wading River, Long Island, N. Y., in June, 1917, and exhibited five boxes of insects and some photographs. He stated that *Cicindela 6-guttata* was the tiger beetle of our fauna most likely to be found on wayside shrubs, etc., and exhibited a specimen that he had taken on the trunk of a tree about three feet from the ground. He said that a good many caterpillars were killed at night by spiders, and with the aid of an acetylene lantern he had discovered a *Pyrus* bush, the terminal twigs of which were covered with aphids and attractive to many moths and roaches as a consequence. This matter and the observation on the dragonflies collected, will be printed in Miscellaneous Notes. He further stated that he had enjoyed some cooked eggs of a bonefoot crab, which was his first experience in eating anything belonging to that ancient type of animal.

Mr. Davis also showed photographs of a remarkable nest of *Vespa maculata* with elongate neck.

Mr. Davis also spoke with regret on the recent death of Mr. Daecke.

Mr. Dickerson read a paper on "*Rhabdoscelis tenuis* on *Hibiscus*" illustrated by specimens of the beetle, its larva, the workings in the stems of the plant and on the leaves. The larva of this species, previously unknown, differs from other Buprestid larvæ and will be described in Weiss & Dickerson's paper when printed.

Messrs. Davis, Shoemaker and Leng joined in the discussion as to the distribution and varieties of the food plant and the beetle, which has been usually found by sweeping in the damp meadows where rose mallow grows.

Mr. Schaeffer spoke of the genus *Mastogenius*, pointing out that its type was a South American species with which our species may not be congeneric, in which case Leconte's generic name *Haplostethus* should be substituted. The species *reticulaticollis*, possessing antennal grooves on the prosternum, in any case seems generically distinct. Mr. Schaeffer exhibited all the United States species except *impressipennis* Fall, and said that his material would require the description of a new species from Arizona.

Mr. Olsen exhibited a long series of *Draculacephala noveboracensis* Fitch and *manitobiana* Ball taken by Mr. Notman in his recent journey to Cochrane, Ont. He said it was interesting to note that the introduced species from Quebec was not included.

Mr. Weiss exhibited and donated to the members specimens of *Zeugophora scutellaris*, a beetle he had found locally common at Arlington, N. J., on poplar in June. His exhibit included the larva in alcohol.

Mr. Sherman exhibited two copies of Thomas Say's "Description of North American Insects" originally printed in a New Harmony newspaper and then bound in book form between 1830 and 1834. One copy contained 73 pages the other 65 pages and both were of unusual interest from the evidence in handwriting of their having passed through the hands of Scudder and Leconte.

# INDEX TO NAMES OF INSECTS AND PLANTS IN VOLUME XXVI.

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